CREATIVE MUSIC IN THE HOME

SATIS N. COLEMAN

YOUR CHILD'S MUSIC
CREATIVE MUSIC FOR CHILDREN
CREATIVE MUSIC IN THE HOME
A CHILDREN'S SYMPHONY
FIRST STEPS IN PLAYING AND COMPO
THE BOOK OF BELLS
THE DRUM BOOK
THE MARIMBA BOOK
THE GINGERBREAD MAN *and Other So*

WITH ALICE G. THORN

SINGING TIME: *Songs for Nursery and S*
ANOTHER SINGING TIME

Creative Music in the Home

MUSIC STORIES

—::—

HOW TO MAKE INSTRUMENTS

—::—

HOW TO PLAY THEM

—::—

AND MANY TUNES TO PLAY

By

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THE JOHN DAY COMPANY

NEW YORK

TO PARENTS AND TEACHERS

It is evident that more and more parents and teachers throughout America are realizing the values of informal and experimental musical experiences, both at home and at school. Since *Creative Music in the Home* was first published in 1927, the type of experience herein described has caught the imagination and stimulated the musical interest of numberless boys and girls who had previously lost all interest in formal music lessons, and whose musical training had completely failed to function. In some cases the results have been almost unbelievable in building seeking attitudes toward music, and in the stimulation of effort toward adequate musical expression. It is therefore in the belief that the book meets a real need, that this new edition is offered.

The modern educator realizes that those things which affect the child's *attitude* toward music study are the most important factors in his musical development; that the child's attitude toward music and music-study is the powerful pulling or pushing force that will either build or thwart his musical development. And more and more we parents and teachers are seeking ways and means of developing and sustaining attitudes that reach out for the healthy forms of musical experience.

The history of all types of education has proved that children are most interested in those materials of learning that offer the opportunity for manipulation, building, exploring, experimenting and creative adventure. In whatever fields the child can do creative work, and can experience the excitement of producing something that is his very own, these are the fields that will hold the greatest charm for him. Therefore, it is not surprising that explorations into the Art of Music along these lines should give a natural stimulus to music study and bring about musical growth that is natural, vital, and truly fundamental.

Throughout these pages will be found suggestions for musical materials that are appropriate for children to handle and explore—both materials and method that will tend to build an intimacy with music. A real intimacy with some kind of instrument is necessary before a child can be free to express musical feeling with his hands. One who builds an instrument for himself is laying the foundation for that intimacy, and for free creative expression in music. The making of the instrument is a building process, but the creative experience of making a melody to play on this instrument follows naturally. There are all degrees of creativity, and the sincere melody-making of a child is as truly creative on its own level as is the composition of the greatest symphony on its higher level.

The child who can make an instrument—be it ever so simple—and then make a melody of his own to play upon it, has experienced a joy that he will wish to have repeated. It is to be expected that some of the results will be crude, especially at first; but if a taste of creative joy in handling the materials of music can enlist an interest that was heretofore denied, and give an impetus toward exploration in the art, does it matter how crude those first sounds may be? True education is not concerned about the finesse or perfection of the child's first or second production; it is concerned about the direction in which this growth is going.

Of course the musical capacities and interests of children differ widely. But if they are offered those things that history shows were vital in the development of the art of music, each child will surely find something of vital interest to him. Even if it be only the making of a primitive tom-tom, it will at least offer a starting-place from which his interest in music may grow. As the art of music was developed by mankind, it grew so slowly and so naturally that there are stages in its growth that are suited to every age, and to every possible degree of talent. Music evolved joyously. All through its evolution from the crude sticks and rattles of the primitive savage, through the drums, pipes and fiddles of more highly developed man, down to the modern symphonic orchestra, the development of music and its expression have been a joyous and joy-giving process; and there is no reason why a child cannot

step with joy into any of those experiences that lie along the path of music's evolution, if care is taken to select those that fit his present level of musical talent and development.

Many young children—and mature persons, too—seem unable to master the technique of the piano or violin in a way to give them pleasure. If we force such instruction upon them, they acquire a dislike that is hard to overcome. But if we give a child music at first that is easily within his grasp, let him play simple tunes on glasses of water, and on other things of his own contrivance; if we let him make drums and rattles, and experiment with the sounds of wood, metal, pipes and strings, his musical power will grow naturally as his interest and achievements grow.

The Number Notation used in this book from page 65 to page 183 is a means of enabling children to read melodies and to write tunes of their own before they are mature enough to master the complexities of staff notation. It may also be used as a shorthand system of "speed writing" for musicians and other adults.

The difficulty of reading staff notation has been a great drawback in the early music study of many children. In thousands of cases it has left only discouragement and unpleasant memory associations which have given those children a definite mind-set against music study. After more maturity and after pleasant music experiences in reading and writing music by number, staff notation will be learned much more readily. See page 185. The reading of music is such an important skill, and so vital in one's musical development, that it should not be spoiled by presenting it too early in the child's musical life. Joyous musical experiences which lead the child to realize the need for conventional note-reading is the best possible preparation for it.

If the child's interest is to hold, he must taste success in his attempts to express himself musically. This is an important reason why he should not be baffled by attempting to read symbols that are too complicated for his complete understanding, and why the first reading experiences of a young child should be in simple number notation. The psychological need for success is also an important reason why simple musical instruments, such as drums, water

glasses, pan pipes, marimbas and psalteries are so important for children's first playing—so they can feel the encouragement of success in manipulating them.

It is hoped that parents will share their children's musical experiences, will sing and play with them, and join their adventures in instrument making; that they will encourage the children in all forms of healthy music expression and in habits of creative work, —remembering that the most valuable and enduring intimacy with music is established in the home.

SATIS N. COLEMAN

New York City, June 1, 1939

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FOREWORD

A Letter to John

My Dear John:

One day about thirty years ago, when your father was a boy only a little older than you are now, he rushed into the big hall of our Southern country home, and stood before me with a grin on his face—a grin so broad that it pushed his ears out of their usual shape, showed all his teeth, and sent sparks flashing from his eyes. I knew he must have a great surprise for me, so I put my book aside and waited until he was ready to bring his hands from behind him. Then I saw a wondrous contraption!

"See my new fiddle!" he exclaimed with great pride. It was a long-necked gourd with a big hole in the round body over which two pieces of cord were stretched from one end to the other. He lifted it to his shoulder and at the same time the other hand came forth holding a bow made of a bent stick with a shoestring stretched tightly from end to end. Then he began to scrape the bow across the strings of the fiddle, and such a squeaking, squawking, funny, whiny sound it made! We were both convulsed with laughter.

"Where on earth did you get it, Tom?" I asked.

"I *made* it, myself!" he said. "Finished it just now out in the barn."

I was your father's big sister, only a few years older than he, but I was old enough to see that he had done a very clever thing. How wonderful I thought he was! He had never played a fiddle in his life, so he knew nothing about how to make a tune, but that did not matter—away he sawed on the strings, back and forth, while his face beamed with delight!

This was such a long time ago I do not remember what he did with his gourd-fiddle, and he, too, has probably forgotten what became of it. Neither do I remember exactly how the fiddle was made, nor the color nor the size of the gourd, but I do remember the look on his face. It was a flare of victory, of joy and complete happiness.

Years afterward I sought in many ways to find out how simple instruments could be made at home. It was a long search, and there were many, many experiments before I began to teach boys and girls to make musical instruments of gourds and hollow sticks and empty boxes, and then to play tunes on them. It has been great fun for all of us; and often when some boy or girl has been brimming over with pride in a good instrument which he or she has made, I have been reminded of your father as he stood in the hall that day with the fiddle he had made.

"If my brother was so thrilled by the making of a gourd-fiddle when he was a boy, surely his children will like making instruments, too," I have often said

to myself. "So I must show them how to make the different kinds of simple instruments—drums, pipes, rattles, marimbas, and banjos; and I must teach them how to play tunes on glasses and on all kinds of things. Then perhaps John could have an orchestra with all the members of the family playing together. But how could I manage it when I live here in New York and they live so far away in Texas?"

Then the idea came to my mind that I might write it all out in a book, with many pictures to show how the instruments are made, and send it on to you.

Now the book is finished. I have tried to show you not only how to make many instruments, but also how to play on them and on other instruments, and how you may find out many interesting things for yourself. You will find music stories that show how some of the musical ideas of the race have grown. There are tunes and many other things that will help in your music study as you grow older. I hope you will find that everything is explained clearly enough for you to understand, so that you will be able to show the younger children how to play many of the easy pieces.

Of course, you know that anyone who learns to make music must have great patience, work very carefully, and go over each little piece many times in order to play it correctly and get the most enjoyment from playing. You will find more pleasure in the book if you do not try to read it hastily, for I have tried

to make it the kind of book that you will like to keep and to use for years to come. Since it will be read also by other boys and girls in different parts of the country, you will not find your name mentioned again, but you may be sure that I was thinking of you and your brothers and sisters all along as I wrote it.

So please accept this book with my love and the wish that all of you children may be as happy with the instruments you may make as your father was that day thirty years ago, when he first showed me his gourd-fiddle.

An Indian Rain-Dance

CHAPTER I

An Indian Rain-Dance

TSAPOWI, the Pueblo Indian, sat on the ground and spoke to his father, old Nalukee. "Why have the rain-gods forgotten us, Nalukee? It has been many moons since they sent us rain. The thunder-bird flies high, and the gods surely know that our crops are drying up, and that the people of the White Eagle Feather must starve if they do not send us rain very soon. The ears of corn are already withering on the stalks, and the melons are small and hard. The large crop of last year will not feed us through another winter, and we shall hear our children calling for food. What shall we do, Nalukee? You are wise. In some far country where you have traveled, have you not heard of a charm or a sign that will persuade the rain-gods to give us rain? Why are they angry? As you know, we have always been kind to our brothers, the animals, and no snake has been hurt in our village."

Nalukee sat for some time looking into the distance. A little whirlwind whisked a few dry leaves from the ground in front of him, carried them high into the air, and then let them float gently down again.

"Go, Tsapowi," he said, "and walk in the corn-field. Watch the little white clouds that play in the blue sky.

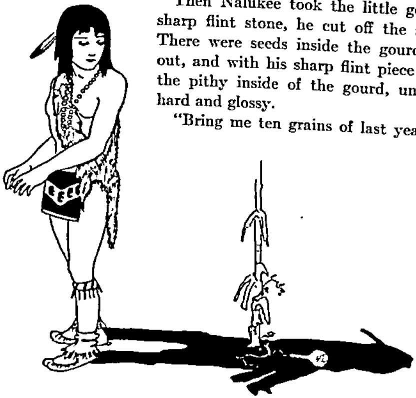
When one bit of white cloud comes between you and the sun, then look upon the ground where your shadow lies, and bring to me the first thing you see. It shall be a sign to the rain-god."

Tsapowi walked in the corn-field among the withering blades of the corn plants. The earth was mere dry sand, so warm that he felt the heat through the moccasins on his feet. A few little white wisps of clouds were floating around in the sky, and for an hour he walked about, watching them. At last one little stray cloud came over the sun. Quickly Tsapowi looked behind him where his shadow lay very dim, and there right in the center of his shadow was a little brown, dry gourd. Its vine had tried to climb a corn-stalk, but it had failed; the vine was now withered, and the little gourd was lying in the hot sand, hard and lifeless. Tsapowi picked it up and hurried to Nalukee.

"Here, O Nalukee, is the thing which lay in my dim shadow when the cloud came over the sun. How shall this be a sign to the rain-god?"

Then Nalukee took the little gourd, and with his sharp flint stone, he cut off the small, slender end. There were seeds inside the gourd. These he pulled out, and with his sharp flint piece he scraped out all the pithy inside of the gourd, until it was smooth, hard and glossy.

"Bring me ten grains of last year's blue corn from



the sacred ear that was set aside; only ten grains." And Tsapowi brought ten grains of the sacred blue corn to place inside the gourd.

"Bring me three pebbles from the Sacred Spring near the side of the Great Brown Cliff." And Tsapowi brought three small pebbles from the Sacred Spring to place inside the gourd.

"Now bring me a stalk of the yellow corn that is drying in the field, that I may fit it into the hole which I have cut in the gourd." And the yellow corn-stalk was brought and fitted into the gourd.

Nalukee shook the gourd back and forth, and there came from it a sound like falling rain! His eyes glistened.

"It will do," he said, "it is the rain sign. Now go, Tsapowi, and bring me black paint from the root of the bee-flower, and white paint, too, that I may make a sign for the thunder and the lightning." And Nalukee painted the black wings of the thunderbird, and white zig-zag lines of lightning all around the little gourd.

"Now bring me red paint from the dust of the red stone in the valley of the great river beyond the mountain." And Tsapowi brought red paint made from the dust of the red stone, and Nalukee painted the end of the gourd red, that it might be pleasing to the eye of the rain-god.

"Go now, Tsapowi, and bring me a white feather from the breast of the eagle." And Nalukee tied the

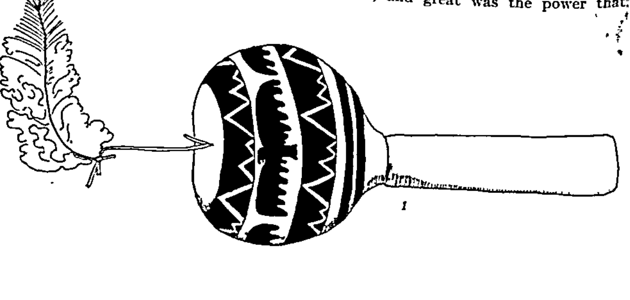
eagle feather to the end of the gourd, that it might waft upward to the clouds the sound of the blue corn and the pebbles from the Sacred Spring; for it was the rolling of these things against the hard inside of the gourd that made, for the ears of the rain-god, the sound of falling rain.

Proudly Nalukee lifted the gourd, and as he did so, the eagle feather rose lightly, as if it would bear the gourd to the sky.

"The sign is ready, Tsapowi, and the rain-gods will be pleased. Go call the chiefs! We will have a dance, and all the people of the village shall sing together. Every man shall shake the rain-rattle, and every woman shall wave a bunch of evergreen, that the gods may know we need rain. They shall be pleased with the sounds we make, and who knows but the rain may come before three days are past?"

It was a wondrous dance. The rain-rattle was lifted high in the hands of every man—each one taking it in turn—and the voices of the men, women and children called loudly to the unseen spirits for rain upon their corn and melons. Longer and longer grew the moving shadows of the dancers as the sun went down in the west. Not until twilight came and the Indians were exhausted in body and voice, did the dance-prayer end.

Now it so happened that rain fell upon their crops before three days were past. Great was the rejoicing among the Indians, and great was the power that



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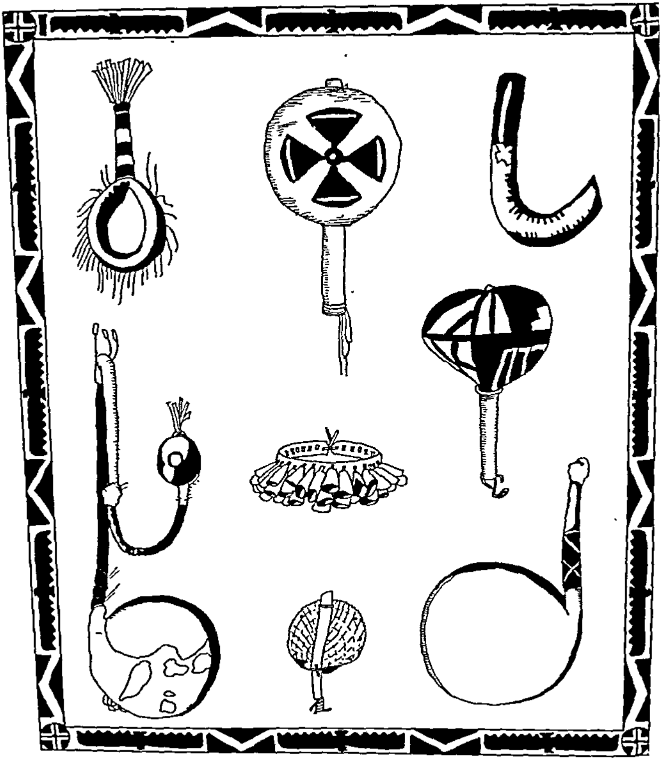
Nalukee was given by the people of the White Eagle Feather. For had he not made for them the rain-rattle, the magic sign that brought the rain and saved the corn and the melons?

In the years that followed the rain-rattle was an object of reverence in the thoughts of the people. All the gourds that grew in the fields were carefully saved, for would not the sign be more powerful if many rattles were sounded at once? It came to be a custom for every village in the dry country to have a rain-dance at least once a year when rain was most needed on the crops, and the rain-rattles were, of course, the most important things in the dance. Every Indian made a rattle of his own, and took great pride in making it as beautiful as he could, and in having it sound as much like falling rain as possible.

The rain-dances still take place every year among the Indians of the Southwest. If you should happen to be in a Hopi village in Arizona at the time of one of the famous rain-dances, you would see an interesting sight, men with painted bodies and strange costumes dancing in the open plaza or square, in the center of the village, and the women and children in their gayest shawls and blankets sitting on the roofs of the houses around the plaza, watching the dancers. Tortoise-shell rattles and bunches of deer toes are tied to the legs of the dancers, so that the motions of the feet shake the rattles and leave the hands free to make



Indian Rain-rattles

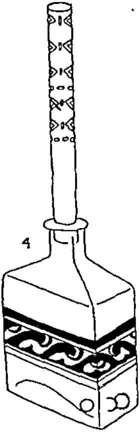
other motions. Most of the dancers carry gourd rattles in their hands also. The rattles keep time to the singing and to the steps of the dancers, and usually there is a rhythmic beat of drums to keep them together.

In some of the dances of the Hopi Indians several men carry snakes, which they believe have the power to help gain the favor of the rain-gods!

In New Mexico, the women and children often join in the dance, which lasts from noon till sundown. During all this time, the sound of the rain-rattles keeping time to the dancers' steps, is heard constantly. There are always a few small children in the dance, learning it by trying to keep step with the older Indians; and by the time they are ten or twelve years old, they are able to dance all of the different steps, keeping perfect time.

Those Indians who have no gourds find other things which they can use to make the rain sound; and they have been very clever in making use of different things which they could find in the fields and forests, Gourds, tortoise shells, hard seed cases, cow horns. sheep horns, sea shells, rolls of birch bark, sheepskin, pig-bladder, wood hollowed out and carved into fancy bird shapes, bunches of deer toes, elk's tusks, bits of shell or metal fastened together, all such things and many others have been used for rattles. Many of the different kinds of rattles may be seen in museums where there are collections of Indian things. A few are pictured on the opposite page.

Children who wish to have an Indian rain-dance



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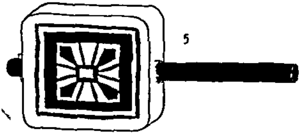
will also need to think of different things they can use to make their rattles. One of the simplest kinds of rain-rattle may be made of a long bottle that is empty and has a cork to fit it. Put a few small pebbles or nails, or some uncooked rice or peas in it, put the cork in tightly, and shake the bottle back and forth until you find the best way to make the sound of rain. An ink-bottle makes a fine rattle when some small shot or nails are put in it, and a stick fitted into the mouth of the bottle for a handle. Some kinds of paint will stick to glass, and the bottles may be given beautiful painted decorations. If there is no paint, strips of colored paper or cloth may be pasted on the bottle, and gay colored streamers may be tied around it, or even feathers, such as the Indians use.

A small cardboard box may have a stick run through it, fastened with a nail or thumb-tack which passes through the cardboard into the end of the stick. (Fig. 10.) A round pill-box, large match-box, or small wooden box of any kind will do. The pebbles or peas or rice should be put in the box before it is closed up, and the outside may be painted or decorated in any way one wishes.

Heavy paper makes a good rattle. Figures 6 and 8 show designs that may be used as patterns for cutting the paper. The pieces may be sewed together, and the finished rattles may be decorated with colored crayons. A paper rattle makes a sound almost exactly like the sound of rain falling on dry leaves in the woods.



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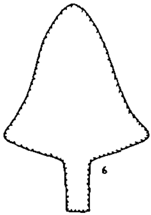

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Anyone who goes to the seashore will find shells which make good rattles when fastened together. A shell rattle is shown among those on page 12.

A gourd rattle may be made as Nalukee made the first famous rain-rattle; or the gourd may have a hole cut in it for the pith and seeds to be taken out, and after the pebbles are put inside, the same piece of gourd may be glued back in its place. If the inside of the gourd is covered with a coat of shellac and allowed to dry before the pebbles are put in, the sound will be a little more distinct. If the gourd has a natural handle like that in the picture on page 13, it needs no other. A round gourd may have two holes put in it, and a stick run through it, as shown in Figure 2 on page 11. Notice the little peg through the stick at the short end, to keep the gourd from slipping off.

When the rattles are all finished, could you make up a rain-dance of your own?

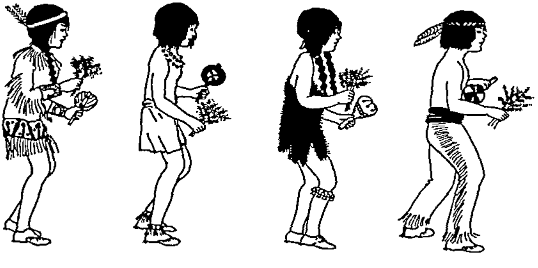
Sometimes a rain may be heard coming in the distance, then falling gradually more and more heavily for a time, then more and more lightly until the storm is over. Could you plan a dance with rattle movements that sound like such a rain?

What kind of dance steps will you use in your rain-dance? The steps of the Indian rain-dances are quite simple. One of the main steps is merely *jumping* first on one foot and then on the other, without moving from one place. It is something like a high prancing without going anywhere! When the dancers have kept

this up for fifteen or twenty minutes, the singers change the song, and the feet take another kind of step.

The new step is just *hopping* first on one foot and then on the other, so that each foot strikes the ground twice before the other one comes down. In this step also, the dancer remains in one place on the ground, except when the entire group is moving gradually in one direction.

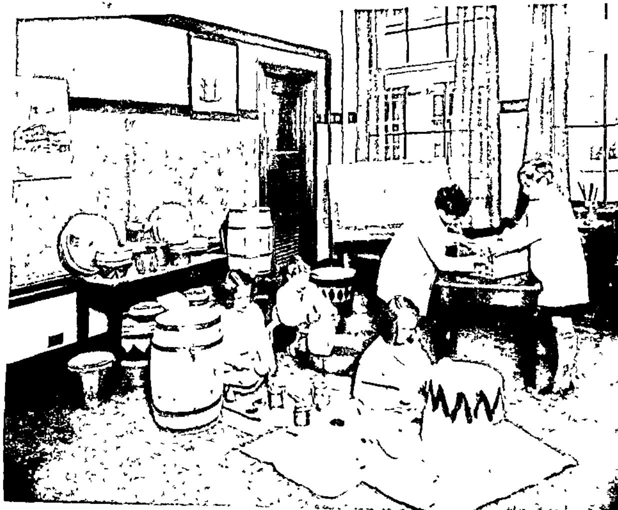
Another step is made by jumping on one foot, and letting that foot slide back a little before the other foot comes down. When dancing to this step the Indians often advance slowly, stepping forward each time and then slipping back a little on the ball of the foot, giving the rattle a shake on the "step," and another shake on the "slide."



Sometimes the Indians take a step forward on one foot, throwing the weight of the body on it, then *lifting the heel* of that foot and tapping the ground with the heel while the other foot is still in the air. When the other foot comes down, the heel of that foot also rises and comes down again. In some of the Indian dance steps, the heel taps the ground several times before the change of foot is made.

If the rain were really beating on your roof, could you have a rain-dance in the house, with a piano accompaniment, and let the piano and the rattles and the feet all keep time with the beating rain?

What kind of song would you make to go with your rain-dance?



Drums and How to Make Them

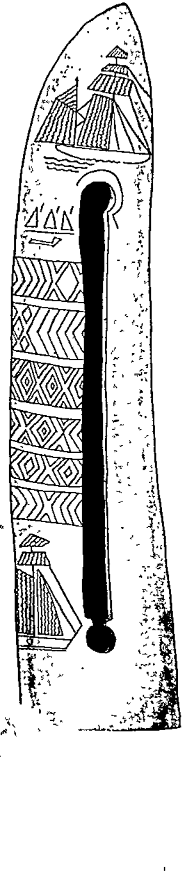
CHAPTER II

Drums and How to Make Them

If the sound of the rattle was a magic sign to the kindly rain-god of the Indians, the drum, to their thinking, had no less power over the "evil spirits" that disturbed the happiness of men. And not only Indians, but savages all over the world seem to have thought of drums as having magic power. It would be difficult to understand just how this belief began, unless it grew from the strange rumbling sound which the savage mind could not explain in any way, except to call it the voice of a strange spirit that lived in the drum. It was easy to imagine that anything with such a strange voice would have magic power.

With such thought of the magic power of drums, there came a time when men began to think of the drum as a god. Indeed it is believed that the drum has been worshipped as a god at some time in the history of every country of the world. In some parts of South America the drum-god is the only object which the natives worship.

Since the drum is so powerful and so important in the eyes of many savage tribes, they have it near at hand on all occasions. The drum is not only a god, but also a means of communication with other gods, a kind of "speaking spirit." At the same time it is a



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musical instrument on which the savage may express both joy and sorrow. It can tell of success in war or in hunting, of disappointments, and of the death of loved ones. When a member of a village dies, the drum may be beaten to prevent the spirit of the deceased from returning to torment the living; or it may be used to make sick people well by frightening away the evil spirit that is causing the illness. Some of the American Indians believe this, even yet. The Apaches used to send for the sick man's relations to come and crouch around him and howl, while the nearest relative would sit upon his chest and shake a rattle or beat a drum till the evil spirit departed. Of course the patient either died or got well as soon as he could!

The drums of Africa range all the way from a tiny hand-drum made of a cocoanut shell to enormous drums made of the largest tree trunks; and have coverings of all kinds from a lizard's skin to heavy cowhide and the skins of other large animals. Some of them have no skins at all, being merely large tree-trunks that have been hollowed out. For this reason they are more like bells than drums, but most people call them drums (Fig. 1).

One of the most interesting ways in which drums have ever been used is the sending of long-distance messages by means of them. The Africans seem to have invented a "telegraph drum" long before our own telegraph was invented. They sink a large wooden drum in the ground, or place it on coils of hemp on the ground, and beat it in such a way that it is heard

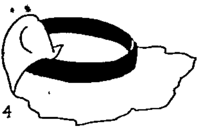
for miles. They use a kind of code which they have developed—a certain group of taps having a certain meaning—and they send all kinds of messages by this regular system of taps.

During the Zulu war in West Africa a few years ago, the German government ordered that no drum should be beaten. The reason for this was that everything the Government soldiers did was "drummed" at once to the most far-away town. If a body of soldiers left one town, it would be known in a few minutes in the next town, by means of the drum.

On page 43 there is a picture of a telegraph drum. The messages sent over these African drums gave one of the inventors of wireless telegraphy his first idea of sending news without wires.

The Eskimos of North America have so few trees, they do not use hollow logs to make drums. Most of the Eskimo drums are flat, consisting of a thin, round frame with a skin stretched across and over it, thus making a tambourine-drum. Sometimes they use seal-skin, and sometimes the skin of a whale's liver or perhaps untanned deerskin. A hoop of whalebone with skin stretched across it is often used and makes a fine tambourine-drum (Fig. 2). The tusk or rib of a walrus is frequently used as a drumstick. The Eskimos often hold religious meetings where they sing and beat the drum in honor of one of their gods, and go through many other ceremonies.

The tambourine type of drum is used also by the Indians of the Plains. A circular frame or hoop is



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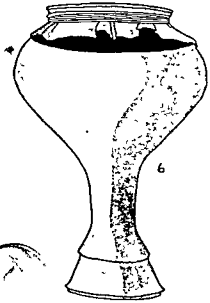
made of wood, then a calfskin, cowhide or deerskin is stretched over the hoop, and the edges are pulled together in the back to form the handle of the drum. (Figs. 4 and 5.) In Figure 3 the skin is held tight by pegs driven into the rim. Sometimes the tambourine-drums are supported by four stakes driven into the ground, and beaten with sticks muffled with leather.

The tambourine-drum with its large smooth skin gives a surface for the artist to try his powers. Some of the Indian tambourine-drums have very interesting designs painted on the skins.

The Indians of the Southwest make baskets of dried grass and weave beautiful designs in them by using grasses that are dyed in different colors (Figs. 7 and 8). One of the most important uses of the basket is its use as a drum. The Indians turn it upside down and tap it on the bottom with a drumstick made of yucca palm leaves. There are various basket ceremonies among these Indians. The Navahos have a nine-day basket-dance, and it would require a long time to learn all the various signs and movements that have to be made around the basket, all the motions of the yucca-leaf stick that taps it, and all the figures that are drawn by sprinkling meal on the blanket, or on the buffalo-hide on which the basket rests.

The vessels which the Indians make of clay are often used as drums. The bowl may be turned upside down and beaten in the same way the basket is tapped. A large vessel with a deerskin or buckskin stretched over its mouth is a very common form of drum (Fig. 6).



6

7

Everyone has heard of the Indian "water-drums." These probably originated when the Indians began to use their bowls as drums. It may have been quite by accident that they discovered the change in tone which was made by putting water in the bowl. Captain John Smith of early American history wrote about the Indian drums of "skin stretched over an earthenware pot half full of water." In some places this kind of pottery drum is called "the singing god." The Indians use kettles of all kinds, partly filled with water and with skins over the top, for water-drums. A large block of wood, very carefully hollowed out so that it will hold water, is a very common form of water-drum. The cover is made so that it can be taken off at will, to put water inside, and then pushed down tightly again (Fig. 10).

A description of all the drums that have been made by the various peoples of the world would fill many volumes. Wherever men have lived, drums have been made to fill certain needs which human beings have felt; and they are still made and used in every part of the world.

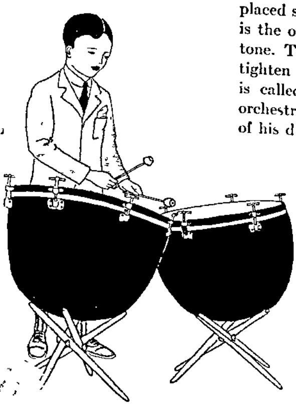
There are three main kinds of drums: (1) Those which have one skin fastened over a hollow bowl-like body of some kind are called *Kettle-drums*. This name was probably given to them because the one-skin drum which is common with us is so much like a big brass kettle. (2) Those having two skins, with an open, barrel-like body, such as a hollow log, between the

two skins, are called *Barrel-drums.* (3) If the body of the drum is only a rim, with a skin stretched over one side, it is called a *Tambourine-drum.*

The tambourine-drum which the Eskimos use has been described on page 15. Most people are familiar with the *Tambourine* which is often used in Spanish dances, and is sometimes used in orchestras also (Fig. 9). It is merely a tambourine-drum with discs of metal fastened in the rim, which jingle when the tambourine is shaken.

9

Kettle-drums are made by people in every part of the world. Some of them are very crude, and some are very fine pieces of workmanship. Most of the kettle-drums in this country are made of copper or brass, plain and unadorned, but they are very important instruments in our orchestras. There are usually two of them, and some orchestras have three or four, all made to sound different tones. Sometimes one and sometimes another sounds best in certain parts of the tune, and the drummer has his drums placed so he can easily reach them all. The kettle-drum is the only kind of drum that makes a really musical tone. The tone is changed by turning screws which tighten or slacken the "head," as the skin covering is called. Have you ever seen the drummer in an orchestra bend over and turn little screws on the sides of his drum, while he waited for his turn to come in



the music? If so, he was getting his drum in tune for its next note. A kettle-drummer must be very skillful, else he may spoil the music entirely.

When the drummer wishes a deadened or muffled sound from his instrument, he puts a cloth over the drum head and taps upon the cloth. This muffles the tone, and sometimes makes it sound very mournful.

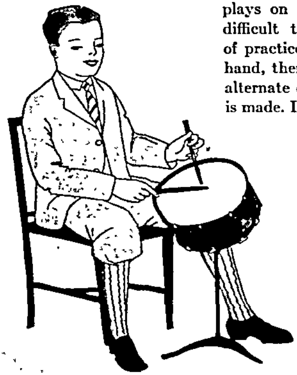
The drumstick is usually a flexible handle of some kind with a knob or button on the end, covered with felt or sponge. Solid balls of felt bring a very pleasing tone from the kettle-drum. The picture on page 24 shows a drummer with two kettle-drums, and shows also how the drumsticks are held.

The two kinds of *Barrel-drum* that are most common in this country are the bass drum and the side-drum Both of these have two skins, one stretched over each end of a hollow cylinder of wood or metal, and the skins are held in place by narrow wooden hoops, or by lacings of cord.

The *Bass Drum* is a large instrument shown in Figure 13, which gives out a deep, booming sound when struck with a soft-headed hammer. In former years the bass drum was long, shaped more like the one in Figure 12, and was called the "long drum," but now it is wider and shorter, having the shape of a wash-tub rather than a barrel. The bass drum is used in orchestras, and in bands and processions. The

heads are tightened by metal rods and screws that pull the hoops together and thus stretch the skins. Only one large drumstick is used with the bass drum. Three different kinds are shown in Figure 14.

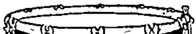
The *Side-drum* is considerably smaller than the bass drum, but is of much the same shape. It is also called the *Snare-drum* because of the "snares," or cords of catgut, that are stretched across the lower head and rattle at every stroke of the drumstick (Fig. 18). Most of the snare-drums which we see in orchestras are made somewhat shallow (Fig. 16), and the hoops which tighten the skins are brought together by means of metal rods and screws such as are used on the bass drum. Some snare-drums, however, are made deep, as is shown in Figure 15. The hoops may be connected by an endless cord passing in zigzag fashion from hoop to hoop, and this is tightened by means of little leather braces that pull the loops of cord together. The snare-drum is played with two sticks made of hard wood (Fig. 17). Perhaps you may have heard the "roll" which an expert drummer plays on the snare-drum. A close, even roll is very difficult to produce, and sometimes requires years of practice. It is made by striking two taps with one hand, then two taps with the other, keeping up these alternate double strokes until a smooth, regular "roll" is made. It is best to learn this when one is young.

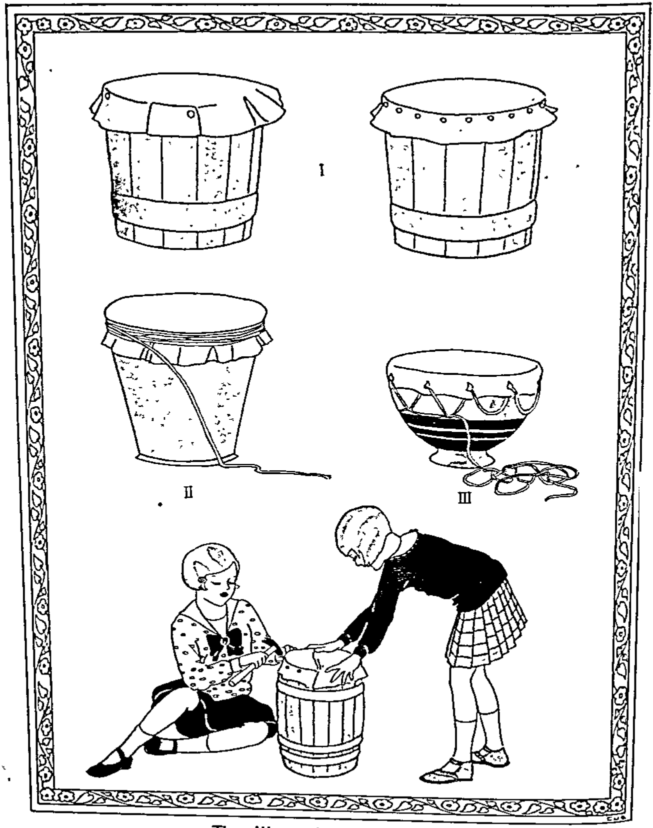


The people of Asiatic countries decorate their drums with intricate and beautiful designs, and in brilliant colors (see Figs. 2 and 3, page 177). The Indians, too, decorate their drums as they decorate their rattles, in gay colors and interesting designs, and with many symbols, such as the thunder-bird and lightning symbols.

Making Kettle-drums. If you wish to make a drum of your own, the first thing necessary will be to find something hollow for the main body of the drum. If it is to be one of the kettle-drum type, you will need only one skin, and something with the shape of a bowl or kettle for the body. Perhaps you can find a yellow mixing bowl in the kitchen, or a stone jar of some kind. A tin pail, a wooden chopping-bowl, a wooden butter tub, or even a round cardboard hat-box may be used. If nothing else can be found, buy a cocoanut, saw it in two pieces with one piece larger than the other, take the "meat" from the larger piece, and use the shell for your kettle-drum.

The best covering for your drum is the kind of "sheepskin" which is used in making banjos, and drums. In stores where musical instruments and music supplies are sold, these skins are called "drumheads." They come in many sizes, and in prices varying from fifty cents up. If you know how to cure skins, that will be even better.





 Three Ways to Make a Kettle-drum

Many primitive people have used dried skins from sheep and other animals without even removing the hair. If you bury a skin for several days in a warm, marshy place, you will be able to scrape all the hairs off and make the skin smooth so you can work with it easily.

Many people cannot find skin for their drums, and will need to use something else. Very strong paper, such as parchment paper, will answer fairly well for drumheads if not handled too roughly. Strong cloth may also be used, and after it is fastened in place, it may be covered with one or two coats of shellac to make it more resonant. Aviator's linen or any good linen cloth is better than cotton. Cardboard may be used if nothing else can be found.

The next problem is that of fastening the skin, or other kind of drumhead, to the body of the drum. There are three ways, depending on the material and shape of your drum-body. (I) If the drum-body is of wood, thumb-tacks may be used. (II) If there is a rim or hoop around the edge of the vessel you are using for the drum-body, a cord may be tightly wound around the edge of the skin to hold it in place. (III) The skin may be held on by a kind of fish-net lacing of cord, made to go over the bowl of the drum.

(I) Let us suppose you have a wooden butter-tub from the grocer's and a sheepskin for a drumhead.

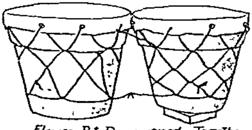
(a) If the skin is much larger than the top of the tub, trim it in a circular shape, at least an inch larger all around, and even larger than that if the size of the skin will allow it.

(b) Soak the skin until it is soft and will crush in the hand like a rag. Squeeze all the water out, spread the skin over the top of the tub and smooth it down over the edges.

(c) Press a thumb-tack into the part of the skin that comes over the edge of the tub. On the other side of the tub, directly opposite the first thumb-tack, press another thumb-tack, with the skin drawn smoothly, but not very tightly, over the top between the two tacks. Pull the skin over the sides, and put two tacks half-way between the first two, on opposite sides of the tub. Other tacks may now be placed between these, always working from one side straight across to the other side, so the skin will be stretched evenly over the tub. If the skin is moderately tight when it is first put on, it will be very tight when it is dry, for skin shrinks and hardens as it dries.

(d) When the skin is perfectly dry, the entire drum may be painted or otherwise decorated in any design one may choose.

(II) In this case let us suppose the body of the drum to be a tin pail. Of course tacks can not be driven into the tin, and some other way of holding the skin in place will have to be devised. The skin should be long enough to extend over the sides for two or three inches at least.


Flower Pot Drums Joined Together

(a) Wet the skin as in case I, and press it over the top of the pail.

(b) Holding the skin in place, wrap strong cord around it several times, just under the upper edge of the pail. Draw the cord very tight and tie it. While the skin is still soft, pull it down under the cord all around the pail, and see that the cord is tight enough to hold it firmly.

(c) When the skin is dry, the tin may be painted.

(III) Let us suppose that an earthenware bowl, or a flower-pot, is to be used for the drum-body, with the skin held down by a kind of network lacing. A cocoanut drum may be laced in this way (Fig. 19).

(a) First find a needle with an eye large enough to carry a strong cord or wrapping twine. A very large darning needle may answer the purpose; but if you cannot find a needle that is large enough, you may nip little round holes in the skin, either with scissors or a "punch," and push the cord through the holes without a needle. These holes should be made around the skin just a little below the circle where the bowl's edge touches it, and they should be placed about one and a half or two inches apart.

(b) Either with your needle or fingers, make little loops of the cord all around the skin (see picture of the bowl on page 28). Tie the two ends together.

(c) Pull all the loops down until they are even, and run a cord through each loop, drawing it very tight around the bowl so as to hold the loops down. Tie the ends of this cord also.

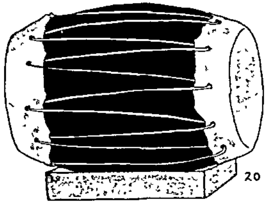
(d) Now make another row of loops attached to the first row, and pull them all down until they are even. Add another straight cord and then another row of loops, and continue until the last row of loops can be pulled together to meet at the bottom of the bowl. Adjust the loops so that they are all tight, and the skin is held smooth, and stretched evenly at all points.

If you use linen for your cover, it may be held down with thumb-tacks or with lacings as just explained. The cloth should be kept dry and stretched just as tightly as possible. When the lacing is finished, add a coat of shellac to the cloth, and later another coat, to make it vibrate more easily.

If paper is used it may be fastened with thumb-tacks. Lacing is not practicable with paper drumheads.

If cardboard is used it may be tacked to the top edge of a wooden drum-body with thumb-tacks or small nails. Cardboard over a deep tub makes a very good drumhead; but none of these substitutes are quite as satisfactory as sheepskin.

Making Barrel-drums. To make a barrel-drum, you must first find or make a hollow cylinder of some kind. If you can find a hollow log, and saw off a section from one to two feet long, you can make a fine drum. If the wall is too thick, burn it out very carefully, or chisel it out, and make the edges at the ends thin, but strong and firm. A nail keg, or an oyster keg with both ends out, a section of paper tubing, a large oatmeal box



20

with both ends out, a large tin can or a metal pail with the bottom cut out with a can-opener, all of these things will make very good barrel-drums (Fig. 20).

You will need two skins large enough to cover the ends, with a margin of an inch or more over the edge.

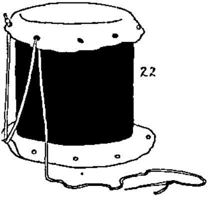
If the cylinder is wood or cardboard, the skins may be fastened on with thumb-tacks as directed on page 30. Whatever the material of the cylinder may be, the two skins may be held on the drum by lacing a cord back and forth between them, making a zigzag line as shown in Figures 20 and 23.

A drum which is to have its two skins laced together should be painted before the skins are put on—if it is to be painted at all—for the zigzag line of cord will interfere with painting the cylinder.

If you have a punch to make holes in the skin, you will not need a needle; otherwise it is best to use a needle, as described on page 31. The two skins should have the same number of holes placed at even distances around them.

(a) Mark a circle on each skin, showing where the edge of the cylinder comes. Mark the places for the holes just outside this line (Fig. 21). The holes should not be too near the edge of the skin, else they will pull out when the cord is tightened. Punch the holes, making the same number in each skin. If you are using a needle and have no punch, mark very distinctly the places where the needle is to go through.

(b) Place the skins where they are to go. Use strong cord or twine for the lacing—not thread, which will cut the skin—and lace it back and forth between the skins (Fig. 22). Ask someone to hold the skins in place while you lace them, for one really needs more than two hands to do it properly. Your drum may be placed near the edge of the table with the cylinder holding down one of the skins, while you draw the string first up, then down. In drawing the string, be very careful to lift it so that it will not cut the skin for a wet skin is very easily torn. It is important that the lacing be finished while the skins are wet, for it is impossible to adjust them smoothly to the ends of the drum body when they are hard and dry. If you cannot finish the lacing at one time, wet the skin and make it soft before you work at it again.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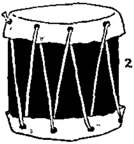
(c) When the lacing is complete, the tightening process begins. Start at a place furthest from the loose ends of the string, and see that each loop of the string is straight and that the skins are placed evenly on the ends of the cylinder, not drawn to one side. Smooth out each loop until you reach the ends, then tie the ends together—loosely, for they will have to be untied in a few minutes.

(d) Begin again at the back of the drum, this time drawing the cord a little tighter, but being very careful that it is lifted from the skin at each pull so it will not tear. Take up all the slackness of the string, press the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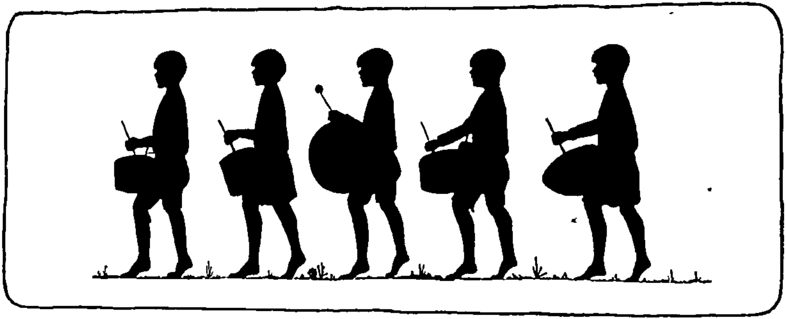
edges of the skin down all around, see that the string is moderately tight, and tie the two ends again, firmly, this time. When the skins dry, the cord will be much tighter.

After the skins are dry and hard, tap them with your finger tips. The tighter the skin is, the better tone your barrel-drum will have, unless it is so tight that the skin breaks. If you find that the skins were not put on tightly enough, you can take them off, remove the cord, soak the skins again, and lace them anew, taking advantage of your experience. If you get the cord too tight and you find a skin tearing as it dries, it might be well to loosen it quickly, or perhaps to cut the cord and mend it later.

A slender stick with a wooden knob on the end of it makes a good drumstick. A piece of doweling with the end rounded off smoothly will also answer very well; or a stick with a spool on the end of it. A piece of cloth around the end of the stick may improve the tone of your drum. The next chapter will describe some of the ways in which you may use it.



Rhythms for the Drum

CHAPTER III

Rhythms for the Drum

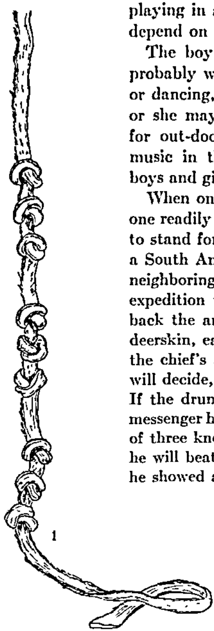
THE African native has his drum always near at hand, ready to be used in times of trouble, to cheer him if he is sad or lonely, to make him well if he is ill, to frighten away evil spirits that he may think are lurking near, to help him express his feeling of joy when he is happy, to beat time to his singing, to give signals for everything that is done during the day, and to help him celebrate all important events that occur in his life. The American Indian in his native village finds the drum equally useful and well suited to his needs.

If you have heard many Indian songs with drum accompaniments, you will remember that Indians beat the drum in many different ways—the rhythm is not always the same. Sometimes it is slow and solemn, sometimes fast and lively, and sometimes it is a mixture of both slow and fast beats. You have probably noticed the same thing about the playing of a drummer in a band. One of the reasons people all over the world have liked drums so much, is because they can express so many different feelings by tapping this instrument in different ways. If you were acting the part of a sorrowful Indian whose home and corn-crop had been washed away by a great flood, how would you tap your drum? Would the rhythm be fast

or slow? Would the taps be heavy or light? If you were calling the villagers to help put out a fire, you would not only beat harder, but you would beat a different kind of rhythm from that of the sorrowing Indian. If you were using it to accompany a song, your rhythm would depend upon the song. When playing in a band or in a parade, your rhythm would depend on the music.

The boy or girl who has made a good drum will probably wish to use it in many ways—for marching or dancing, for singing and for playing in a band. He or she may wish to make up some telegraph signals for out-door games, and to beat rhythms to piano music in the house. Perhaps this chapter will help boys and girls to be good drummers.

When one reads about drum rhythms from a book, one readily sees the need of some kind of written signs to stand for different ways of tapping the drum. Once a South American Indian chief sent a messenger to a neighboring chief to find out if he would go on a certain expedition the following day. The messenger brought back the answer in the form of two slender strips of deerskin, each with several knots tied in it. "Here is the chief's answer," he said. "When the sun sets, he will decide, and will send you a message on the drum. If the drum beats this, his answer is 'yes'," and the messenger held out a long strip of skin with three groups of three knots tied in it (Fig. 1). "If his answer is 'no,' he will beat this rhythm on his drum," and this time he showed a strip with uneven knots (Fig. 2).



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The knotted string of deerskin answered the purpose of the Indian perfectly well. He knew that the first string said "three quick beats, a pause, three quick beats, a pause, and three more quick beats." Can you tap on your drum the rhythms of the two strings?

The idea of the knotted string is a good one for making signs of rhythm, but people who have paper to write on do not need to bother with strings, for a row of dots on paper will answer just as well. If you wish to write out directions for drummers to beat steady taps for marching, all you need is an even row of black spots like this

to show that none of the beats are faster or slower than the others. For many, many years people have used these signs for a steady rhythm, and they usually put a little stem on each spot and call it a *note*. So the signs for the beats of a steady marching rhythm usually look like this:

The feet march the rhythm steadily, right, left, right, left, while the drummer taps exactly as the feet step, rap, tap, rap, tap.

Suppose you wanted your drummers to beat only half as fast—having the marchers step exactly as before, but letting the drums tap only when the right

foot comes down. If you were making your signs on a string, you would leave twice as much space between the knots, but that would take too much space on the narrow page, so we will just take away some of the blackness of the spot and make the notes look like this, when we wish them to go *only half as fast as the* others:

𝅗𝅥 𝅗𝅥 𝅗𝅥 𝅗𝅥 𝅗𝅥 𝅗𝅥

If the marchers are stepping to this rhythm

♩ ♩ ♩ ♩ ♩ ♩

and the drums beating to this rhythm

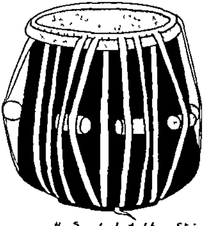
𝅗𝅥 𝅗𝅥 𝅗𝅥

the drum beats come on *every other step.*

If, for some reason, you wish the drum to beat on every fourth step only, you could show this by taking away something from the note—the stem this time, leaving only the hollow shell of the round note: 𝅝

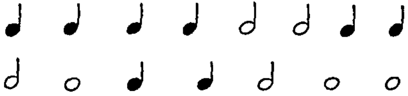
A line of notes to show that one beat lasts for four of the marchers' steps would be:

𝅝 𝅝 𝅝



with Spools to tighten Strings

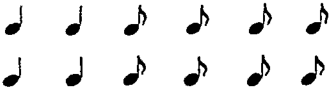
These open notes without stems are the slowest notes that are used in writing down rhythms. They are called *whole notes.* The open notes with stems are *called half notes, for each one lasts half as long* as a whole note. The black notes, which show the regular marching rhythm, are called *quarter notes* because each one lasts only one quarter as long as a whole note. Can you call the names of the notes in the following line of signs, and play the rhythm on your drum?



The steady beat of quarter notes on the drum sounds as if it says "Rap—tap—tap—tap—rap—tap—tap—tap." Have you heard drum beats sound as if they said "Rap it, tap it, rap it, tap it?" In this case the notes go twice as fast, and two taps of the drum are made for every marching step. Here is the sign for four of these fast notes:

Each note has a little flag on the end of the stem to show that it goes faster than the black note without a flag. These notes with one flag are called *eighth notes.* You could step eighth notes by marching double-quick, or by trotting twice as fast as regular marching time.

A rhythm that sounds like this, "Rap, tap, rap it, tap it, rap, tap, rap it, tap it," would be written:



Can you beat this rhythm on your drum?

Two eighth notes are usually made with their flags joining, thus:

and the same rhythm may be written:

Here one sees at a glance that the two notes go together, two taps for one marching step.

Sometimes a drum rhythm seems to say "Rapity, tapity, rapity, tapity!" Can you beat the rhythm of these words on your drum? The beats come in groups of three notes in each group. They are called *triplets* because the three notes are always played in one group—three notes to one marching step—the three together taking only as much time as one quarter note. Triplets are written thus:

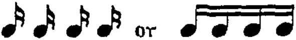
or

The figure 3 is placed over each group to show that the three go together as one, lest they may be mistaken for eighth notes, which also have only one flag on each note.

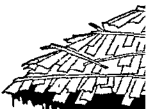
Can you play this rhythm:

It says "Rap, tap, rapity, tapity, rap, tap, rapity, tapity, rap." As you beat this rhythm on your drum, can you, at the same time, march with your feet steadily stepping quarter notes?

Have you heard drum beats that seemed to say "Tapperapper, tapperapper, tapperapper?" See if you can make your drumstick beat the rhythm of these words. In this rhythm the beats come in groups of four quick notes, four notes coming in the time of one quarter note. These notes are written:



each note having two flags. They are called *sixteenth notes*.



Note Values

It takes two of them to fill the time of one eighth note. It takes four of them to fill the time of one quarter note. It takes eight of them to fill the time of one half note. It takes sixteen of them to fill the time of one whole note. It is thus easy to see why they are called "sixteenth" notes. Perhaps the picture on page 44 will help to make these note values clear.

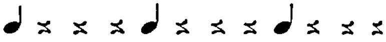
Now that you know all the different kinds of notes, you will be able to make combinations of them so that your playing will be more interesting. Play the rhythm at the bottom of this page. On the margins of page 46 and page 47 you will find two good marching rhythms. The line of quarter notes shows the steps of the marchers while the rhythm below is played on the drum.

Can you make up a march rhythm of your own, and write it down?

Rests. When a person *sings* half notes or whole notes the voice goes on sounding as long as the notes are supposed to last. But drums do not continue to sound long after they are struck. For this reason the signs for whole notes and half notes are not always used in writing drum rhythms. If there is a long wait between beats, a *rest* sign is often used. This little sign like a z made backwards, 𝄽 , means to rest, or wait, as long as a quarter note would last. A drum rhythm of half

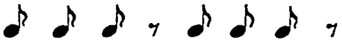
notes could be written with quarter notes and quarter rests, thus:

A rhythm of one beat to four steps might be written



instead of using the sign for whole notes.

Sometimes one may wish to rest only as long as an eighth note. The sign for an eighth note rest is a little slanting stroke:  Play this rhythm:



On the drum it sounds exactly as if the signs were written

Accent. When Primitive Man first began to beat a drum, his idea may have been to tap it as steadily and evenly as he could—like the steady beat of falling rain—without any change whatever in the rhythm. When he got tired of that, he probably made experiments with slow beats and quick beats, and made for himself many interesting rhythms, just as you have made. He did not know that he was beating "note

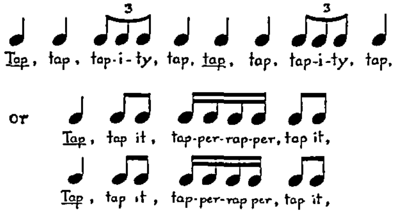
values," and he had no idea how to make signs for his taps, but no doubt he *felt* the rhythm as distinctly as you can feel it.

Of course there were times when he tapped softly, and times when he tapped loudly. Then there probably came a time when he tried using both loud and soft taps in the same rhythm. No doubt he found it interesting to experiment with different ways of using loud and soft sounds by making heavy taps and light taps with his drumstick. He must have liked these changes, for people naturally like change and variety in everything. Perhaps he fell into the swing of making every other beat heavy and every other beat light, so that it sounded *tap*, tap, *tap*, tap, *tap*, tap, *tap*, tap—and this must have given him pleasure, for it is natural for people to like some regularity, even in things that are different. Which do you like best, to beat heavy and light taps without any plan, or to tap them according to the regular plan of "heavy, light, heavy, light?"

There probably came a time when Primitive Man fell into the swing of making every third beat, or every fourth beat heavy, and this, too, gave him pleasure. Without realizing it, he was using one of the most important principles of drum beating, and of all music too—the idea of *accent*, or having heavy beats come in regular places.

If you listen to a good drummer as he taps for people to march, you will hear the heavy or accented beats. Perhaps they come on every other step, or maybe on

every fourth step, but if it is a good rhythm the accent will come regularly on the same step all the way through. The beats may be slow or fast, or a mixture of various kinds of slow and fast taps thrown in between the accented ones, but the accented tap must still come on the regular step. For example, if the accent comes on every fourth beat, the drummer might tap the rhythm thus:



In either case the accents come on every fourth step of the marchers, although many fast notes may be thrown in between.

Tap the above rhythms and see if they are good for marching. Can you make other rhythms with the accent coming in regular places?

Measures Primitive drummers can feel the regular accent in the rhythms they play, and they teach others by showing how it is done. Can you think of a way in


Indian Barrel Drum

which Primitive Man could show, not only rhythms, but the accent also, by means of a knotted string, such as the one mentioned on page 38.

Civilized people have devised two ways of showing the accents in rhythms that are written. (1) One sign is a straight line drawn just before the note that is accented. If the accent comes on every other beat, it is shown thus:

and we know that the first note after each line is the accented one. If the accent comes on every third beat, the lines are placed thus:

These lines are called *bar lines* and they divide the row of notes into *measures.*

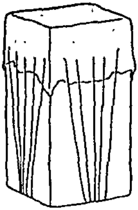
(2) Each one of the measures in the above line of notes has three quarter notes in it. Long ago someone started the plan of putting two numbers in front of the line of notes, thus:

to show that each measure was to have three quarter notes in it, with the first note in each measure accented. Can you copy the two lines of notes written below and put the bar lines in the right places?

Although the bar lines and the numbers mean the same thing, they are both usually used in writing rhythms and other kinds of music.

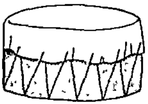
A rhythm which has every other quarter note accented as shown by this sign: $\frac{2}{4}$, is said to be in *two-four meter*, which is another way of saying that every measure has two quarter notes in it, or else a group of notes that last just as long as two quarter notes would last. Fast notes or slow notes may be used instead of the quarter notes, as shown in the rhythm on page 51 or in this:

When the accent comes on every third quarter note, this is the sign: $\frac{3}{4}$, and the rhythm is said to be in *three-four meter*, with three quarter notes, or their equal, in each measure. Can you place the bar lines correctly in this rhythm?



Coffee Can Drum

Sometimes a rhythm is made mainly of eighth notes, and it may be in *two-eight* or *three-eight* or *six-eight* meter. Copy the rhythms at the bottom of this page and the next, and place the bar lines in front of the proper notes.



Cheese-box Drum

Fill in the bar lines and try this as a skipping rhythm. In this rhythm every other note is a quick one to match the quick, skipping step:

If the accent comes on every fourth quarter note, the rhythm is in *four-four-meter* with four quarter notes, or their equals, in each measure, and this is the sign: $\frac{4}{4}$.

Dotted Notes. Sometimes a drummer wishes to hold one note a little longer than usual, and then make up for it by letting the next note be shorter than usual, still keeping his measures of the same length. The sign for this is a dot after the note you wish to hold, thus:

The dot means that you are to hold the note half as long again as you usually hold it. A dot after a whole note makes it as long as three half notes, instead of two. A dot after a half note makes it as long as three quarter notes. A dot after a quarter note makes it as long as three eighth notes, or a quarter and an eighth note. If your rhythm is in two-four meter, and one measure has a dotted quarter note in it, you will need an eighth note, or two sixteenth notes, in order to fill out the time value of the measure.

Can you beat the rhythms at the bottom of this page on your drum, and accent the proper notes?

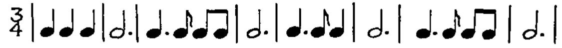
Copy these notes and divide them into measures:

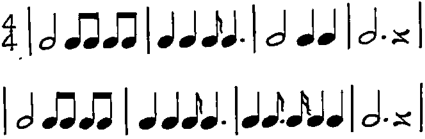
If you can place all the bar lines properly, and if you can play on your drum all the rhythms so far given in this chapter, with the accents in the right places, you will be able to read song rhythms and dance rhythms from music books, and play them on your drum. You may also write new rhythms of your own, so that others can read them and accent them properly.

Nail-Keg Drum

Here is the rhythm of a song you have probably heard many times. Play the rhythm, and see if you can tell the name of the song:

At the top of the next page is the rhythm of another song you probably know.





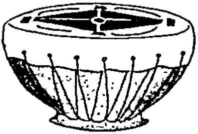
Perhaps you can play song rhythms on your drum while someone else plays the tune on the piano. Can you play new rhythms from song books, those you never saw before, while others play the tune, and while all of you sing together?

The drum makes a wonderful time-keeper for dancing, and many dances require no other musician if there is a good drummer. The skipping rhythm given on page 51 may be made more interesting by adding a little variety to it, as for example:

Pop Goes the Weasel is an old fashioned dance that is very jolly, in which the dancers run up and down the line and swing their partners while the musicians play or sing, and the drummers beat the rhythm given below:

The Shoemaker's Dance is a good one to teach to the younger children while you furnish the music with your drum. The rhythm seems to say:

> Wind your bobbin, wind your bobbin,
> Pull and pull and tap, tap, tap!
> Wind your bobbin, wind your bobbin,
> Pull and pull, and tap, tap, tap!
>
> Skip around and take a rest,
> Tra la la la la la la!
> Skip around and take a rest,
> Tra la la la la la la!



Mixing-Bowl Drum.

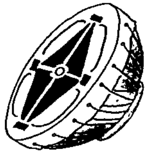
The rhythm for the drum to beat is given below. If there are several drums beating exactly together, so much the better.

Dancers: Partners face each other. With elbows up and hands clenched, roll one fist over the other three times during first measure, as if winding up thread. Roll in the other direction during second measure. Pull fists apart twice during third measure, as if pulling thread very tight. In fourth measure, hammer the fists three times as if driving the peg. Repeat.

Partners join inside hands, outside hands on hips, and dance with either skip or polka step, for the next four measures. Repeat.

Dance first part again. Repeat.

Have you heard a song called *The Campbells are Coming?* It is a well known Scotch song, and many



people use the tune and the rhythm of this song for dancing. The *Heel and Toe Dance* goes very well with this rhythm which is given below. Here are the directions for the "heel and toe" step:

Dancers: On beat marked 1, jump, touching right toe to floor at right side—heel up.

On beat marked 2, jump, touching right heel in same spot—toe up.

On beat marked 3, jump, touching right toe to floor on left side of left foot—heel up.

On beat marked 4, jump, flinging right leg straight out to right.

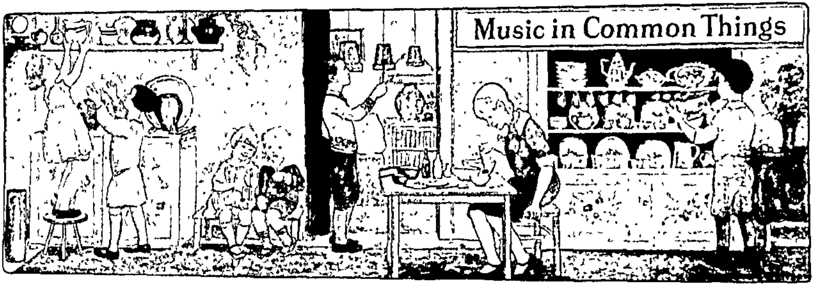
In next two measures take same motions, reversed, with left foot, jumping at every step.

If there are several children who have drums and can play them together, many combinations may be made, for instance:

(1) One drummer may beat regular quarter notes or half notes, while at the same time another beats a rhythmic pattern which has a variety of fast notes in it.

(2) While someone plays the piano, let one drummer beat the accented notes, or the first note in each measure, while another beats the unaccented notes.

(3) Let each drummer take turns at playing the rhythm of a familiar song, and see if the others can guess the song.


Music in Common Things

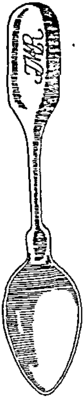
CHAPTER IV

Music in Common Things

PLAYING rhythms on a drum gives an interesting kind of musical expression, but one can hardly play a *tune* on a drum. In order to make tuneful music there must be something that will give ringing or singing sounds. Have you noticed the difference in the sound of a drum tap and the sound of a bell tap? With a pencil or a small stick, tap the floor and then gently tap the side of a plate or saucer. Which gives a singing sound? Tap the table and then tap the side of a drinking glass. Which is the singing sound?

A singing or ringing sound is a *tone*. If it is pleasing to the ear, it may be called a musical tone. If the saucer or drinking glass is tapped in just the right way, its tone is musical, and perhaps you may be able to sing the same tone with your voice. Are there other things about the house that have singing tones?

Here is a hunting match in which everybody in the family, except the very young ones, could take part: Go about the house and yard and gently tap everything which you think might have a musical tone. Take with you a pencil and paper, and make a list of all the "singing" things you find, tapping everything from the door knob in the hall and the teaspoon in the pantry, to the blade of the hoe in the garden, and

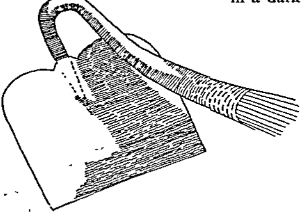


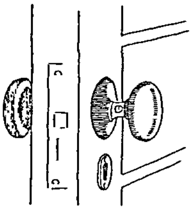
keep your list. Tap very gently so that nothing will be broken, for you are out of the game if you break anything. Do not let the other members of the family follow you, for each one must make the search alone. The one who has the longest list of "singing" things is the winner, if he can prove that everything on his list really *sings when it is tapped. It would not be fair to give a* list of things in this book, for that would spoil your chance of finding them without help.

Anyone who plays this game cannot fail to notice the different kinds of tones among all the things which are tapped. Probably some of the things sound deep and heavy, like the lowest tone, or note, of the piano, and some of the things may sound high, like the chirp of a cricket—so high that you could not possibly match the tone with your voice. It may be that some of the things sound solemn, and some may be as cheerful as a robin's note. Some of the tones may be almost alike. Perhaps already you may have the idea of bringing some of them together and playing a tune on them.

That is what the children are doing in the picture on page 56. The big girl in the center is trying to find things whose tones sound well together. The two little children are tapping pieces of silver that are tied on a string so as to swing freely in the air, and they may be playing a tune. The big boy in the doorway must have heard about "flower-pot music."

Once a boy who was exploring in the cellar for musical tones, found several empty flower-pots stacked up in a dark corner. He took them apart, set them in a





row, and by carefully tapping and comparing their tones, he found three flower-pots that gave almost the exact tones of the first line in the song *Three Blind Mice*. He brought them out and washed them, put them in a row and not only played "Three Blind Mice," but composed, or "made up," many little tunes of his own, playing the flower-pots by tapping them on the side with a wooden hammer. You may be sure that he surprised his family and friends with his new musical instrument.

He made a frame and fastened a strong rod across it, so he could swing the flower-pots from the rod and let them hang down like bells. Each flower-pot had a hole in the bottom. He cut a small strip of wood to place inside the flower-pot, tied a string around it, and pulled the string through the hole. The stick was too long to go through the hole, so when he tied the string to the rod the flower-pots swung freely but securely. The three swinging flower-pots had tones that were somewhat like the tones of bells.

If there are many saucers to select from, it is quite possible you may find two or three that sound right for playing a little tune, or perhaps two or three drinking glasses.

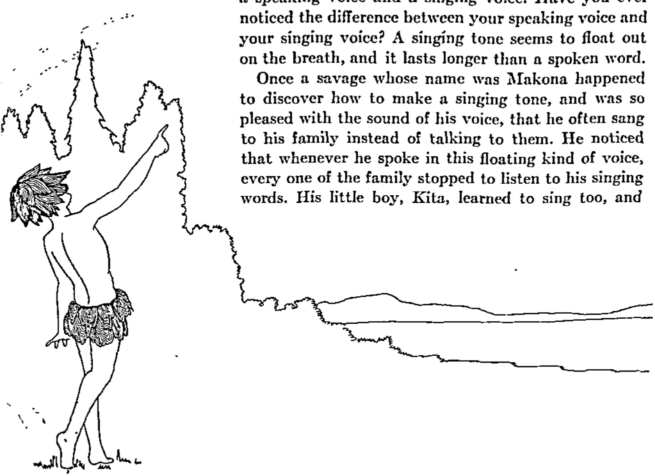
Can you match with your voice the sounds of the things you have tapped which are musical? Of course some will be too high or too low for your voice to match them. The highness or lowness of a tone is called its *pitch*. Is the pitch of thunder high or low? Is the pitch of a cricket's song high or low? The moo of a cow?

Have you tried tapping the side of a drinking glass for a musical tone? If so, perhaps you found glasses that were different in pitch. Can you play a tune on only two glasses? Perhaps you can sing a song that has only two notes in its tune. Many songs sung by primitive people have only two notes. In fact, some savages sing on just one note; that is, all their tones are sung at the same pitch. If you know the rhythm you can play a one-note song on anything that sings.

When one thinks of the long-ago days of music, one cannot help wondering what kind of songs the primitive people sang. The songs must have been very simple. There are, even today, some savage tribes who have no songs at all—probably they have never discovered that they have singing voices!

But most people in the world have discovered at some time in their lives, that they have two kinds of voice,—a speaking voice and a singing voice. Have you ever noticed the difference between your speaking voice and your singing voice? A singing tone seems to float out on the breath, and it lasts longer than a spoken word.

Once a savage whose name was Makona happened to discover how to make a singing tone, and was so pleased with the sound of his voice, that he often sang to his family instead of talking to them. He noticed that whenever he spoke in this floating kind of voice, every one of the family stopped to listen to his singing words. His little boy, Kita, learned to sing too, and



many were the times that Makona and Kita talked to each other in singing voices. Makona told stories to his children in singing voice, and he liked to watch their faces as they listened to his deep, rumbling tones.

Sometimes Kita sang songs and told stories in his high singing voice. One strange thing about the songs which Makona and Kita sang was that the tune was all on one note, and did not go up and down as our songs do. Kita sang songs about the rainbow in the sky and about the river and the forest animals, and made up stories for the other children, singing them on one note.

Makona and Kita always made up their songs as they sang them. Perhaps they sang words of this kind:

"Oh, I like the rainbow,
The beautiful, beautiful rainbow!"

or, perhaps

"The river runs fast,
The river runs fast!"

or,

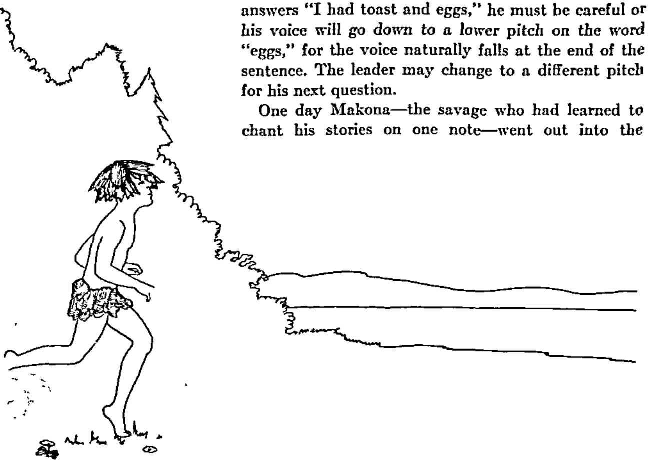
"I love the bright sunshine,
It makes me so glad,
It *makes me so glad!*"

Songs on one tone are called *chants,* and they are the easiest of all songs to sing, because one has only the words and one tone to think about.

Have you ever sung a chant with no tune except one singing note? Try to tell a story by singing it on one note and see how it sounds. When you once make a clear, "floating" tone, you will find it easy to keep all the words on the same pitch. Some people sing on one pitch even when they *try* to let the tune go up and down; but most people can keep their voices on one note when they wish to do so, and then let the pitch go up and down whenever they wish to change the tune.

Sometimes children play a musical game by singing questions and answers on one note. The question is asked by the leader, who keeps his voice steady, and points to the person who is to answer it. If the answer is not sung on the same note, or if it does not keep steadily on the pitch, the child who has sung the answer must pay a forfeit. Another way is to have him step out of the game. If the leader says "What did you have for breakfast this morning?" and the chosen child answers "I had toast and eggs," he must be careful or his voice will go down to a lower pitch on the word "eggs," for the voice naturally falls at the end of the sentence. The leader may change to a different pitch for his next question.

One day Makona—the savage who had learned to chant his stories on one note—went out into the



woods and was gone a long time. Finally, late in the afternoon, his little boy Kita saw him bounding through the forest, leaping over rocks as he came running toward his cave. Makona seemed excited about something and the little boy ran out to meet him, to see what it was all about. His father was smiling and carried a big brown roll under his arm.

"What is it, Father, that you carry under your arm?" asked the little boy in his savage language, which we would never have understood.

Then the father began to dance and skip about. He did not answer the child's question, and held the bundle behind him just to tease. Kita begged to know what it was. Soon the father turned in his dancing, made a dash at the boy and said in a chanting tone, "The skin of a *bear!*"

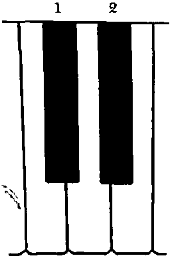
Now he probably thought he was going to chant it all on one tone as he had always chanted, but something made him sing it a little differently. Perhaps it was because he was so excited, that when he came to the word "bear" the tone came unlike the others, and sounded higher, "The skin of a *bear!*" As soon as he had sung it he noticed that it was different from his other sounds, and he sung it again in just the same way. He liked it so much that he kept singing it over

and over to Kita: "The skin of a *bear*, the skin of a *bear*." The little boy soon caught the tune and he joined his father. If you had been peeping through the woods just then you would have seen the child and his father holding hands, dancing round and round, and singing the same little song over and over. Soon they added another verse: "I killed in the *woods*," and still another, "To keep my boy *warm*." And the last word of every verse was higher in pitch than the others, like the tune of the first verse. When they came to the front of the cave, there were the mother and all the other children, watching them; and very soon everyone was dancing. They all learned the song, and you never heard such a lively song, and never saw such a merry dance as that savage family danced in celebration of the bearskin. They not only had a beautiful bearskin for a new coat, but they had accidentally found a new way to sing, that made their songs much prettier.

After that, of course they wanted to chant all their songs in this new way, and they made some very pretty chants with these two notes.

It is almost as easy to chant on two tones as on one. You just have to remember to sing on a little higher pitch when the high tone comes.

Can you make up songs on two notes? If you have a piano or an organ in your home, find a place where there are two black notes close together, and make up a song with only those two notes in the tune. Use any words you like, and play it on the two black keys as you sing it.



If you wish to write down your tune, so you will not forget it, the two tones may be numbered. Call the lower tone Number 1, and the higher tone Number 2.

Suppose these are the words of your first line: "Rain is falling on the ground." Write the words first, and then put the numbers under the words to show the tune. Suppose this is the tune:

Rain is falling on the ground

1 1 2 2 1 2 1

The rhythm could be shown by adding a line of notes above the numbers:

1 1 2 2 1 2 1

The words may be written either above or below the tune. Perhaps it is a little more convenient to write the words below the tune, thus:

1 1 2 2 1 2 1

Rain is falling on the ground

Can you sing your favorite poem to a tune of only two notes?

Here is one verse of a well known rhyme, set to a two-note tune:

♩ ♩ ♪ ♪ ♩

1 2 1 1 2

One, Two, Tie my shoe;

♩ ♩ ♪ ♪ ♩

1 2 1 2 1

Three, Four, Shut the door.

This can be written in another way, and we will not need the line of notes above, if we remember these two things: first, that the plain numbers mean quarter notes, and second, that a circle around two numbers means eighth notes. It would then be:

1 2 1 1 2

One Two Tie my shoe

1 2 1 2 1

Three, Four, Shut the door

Here is the tune of a song sung by certain savage people. A number with a dash after it means that the note is held for an extra beat—a half note:

12 1- 12 1- 21 2- 12 1-

You can see from the way the numbers are written that the rhythm is

Have you found things about the house that make two tones which sound right for playing the tune of "One, Two, Tie my Shoe," or for the savage song? Can you find two cereal bowls that sound right for a two-note tune? Can you make up a pleasing tune on them and write it down, showing the numbers and the rhythm also?

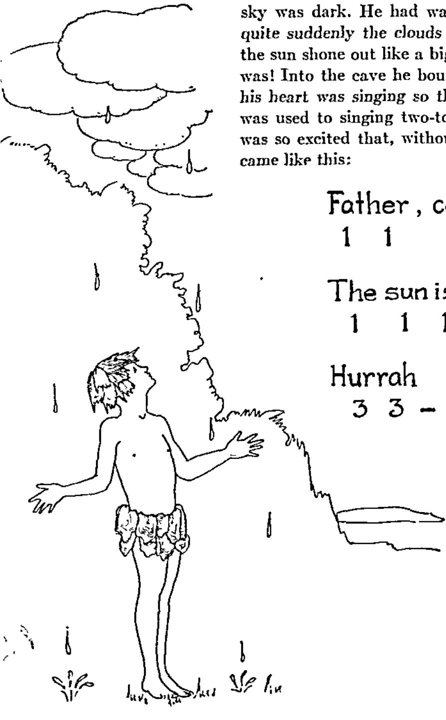
As Kita grew older his father thought it was time for him to learn to hunt, so one morning he said to Kita:

"We have had many rainy days, Kita, but surely the sun will shine soon. If the sun shines brightly today, I will take you with me when I go into the forest. We will find some berries and perhaps get another bearskin."

Now if there was anything in the world that Kita wanted to do, it was to go with his father, deep into the woods, and see him kill a bear and help him get the skin. He was so happy that he couldn't help singing,

Hurrah, Hurrah, Hurrah, Hurrah!
1 1 – 2 2 – 1 1 – 2 2 –

and he took his seat on the ground outside the cave, to watch the sky. The clouds were still heavy and the sky was dark. He had waited for a long time, when quite suddenly the clouds seemed to blow away, and the sun shone out like a big red ball. How happy Kita was! Into the cave he bounded to tell his father, and his heart was singing so that he had to sing too. He was used to singing two-tone songs, but this time he was so excited that, without his knowing it, the song came like this:



Father, come and see
1 1 2 2 3 – –

The sun is shining bright
1 1 1 2 2 3 – –

Hurrah Hurrah!
3 3 – – 3 3 – –

You see, when he got excited, his voice just naturally went up to a pitch that was still higher, and he sang a three-note song because he was so happy. When Kita saw how easy it was, he sang three-note songs all the way through the forest, just making up any words he felt like singing; and some of his tunes were very pretty.

When you have as many as three different pitches to use, you can skip about from one to the other, and make more interesting tunes than you can when you have only two notes.

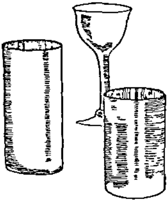
If you will find a group of three black keys on the piano and play them, you will hear three tones which sound right for a three-note tune. The key on the left side is Number 1, the key in the middle is Number 2, and the key on the right side is Number 3. If you have had singing lessons at school, you may possibly know these tones as *Do, Re, Mi.*

Play this tune on the three black keys—

3 3 2 2 1 2 3 2 1

Another way to write it, is:

3 3 2 2 1 2 3 2 1–



Here is a very well known tune which is sung and played on three notes. The words are:

"Hot cross buns! Hot cross buns!
One a penny! Two a penny! Hot cross buns!"

The tune is:

3 2 1 – 3 2 1 –

1 1 1 1 2 2 2 2 3 2 1 –

The rhythm, as you see, is:

Can you tap this rhythm on your drum?

Can you play the tune on the three black keys and sing it at the same time?

Can you find three saucers that make the right notes for *Hot Cross Buns?* Three plates? Or three glasses?

Once a boy who was waiting for his father in a hardware store, saw a keg with some very large nails in it. He held up one of the nails, tapped it with another nail, and found that its tone was musical. He tried the tones of several of the large nails and, in a few minutes, he had selected three that sounded just right for the tune

of "Hot Cross Buns." He bought the three nails for a penny. When he got home he tied them on a string, and fastened the two ends of the string to a frame, so that the three nails hung down, swinging freely. Tapping the musical nails with another nail, he found that their tones were even more musical when they were swinging than when he had tapped them in the hardware store. His family were delighted when he played "Hot Cross Buns" on the nails, and his big sister at once got the idea of having a duet, by playing the piano while he played the nails. Fortunately the nail tones matched three tones of the piano, and as soon as the sister had found the keys and proper basses to go with them, they played a *wonderful* duet for the family.

How many collections of things about the house have you been able to find, which sound right for "Hot Cross Buns?" Have you tried bottles, soup dishes, spoons? Have you found other keys on the piano, white ones perhaps, that sound right for the tune of "Hot Cross Buns?"

Tuning the Glasses

CHAPTER V

Tuning Glasses and Bowls

THREE notes that come in a row, like those in a group of three black keys on the piano, give the foundation for all kinds of tunes. Such notes are sometimes called a *Three-note Scale.* Three notes are all that are needed in order to skip about and have some variety in a tune, and there are many three-note tunes that are very pretty even if they are simple. Different rhythms may be used to make the tune more interesting. Anyone who can sing a three-note melody and keep on the right pitch, will not have much trouble in keeping other notes on the right pitch. A person who can play a tune on three black keys of the piano—or on three glasses, bowls, saucers or other things that are in tune for a three-note scale—and who can play the tune to its exact rhythm, will also be able to play other pieces and other instruments that are more difficult and more interesting.

In order to play a tune properly, the tones of the instrument must be exactly right in pitch—not just almost right. If it is a three-note tune, the instrument must be tuned very accurately to a three-note scale, such as you hear when you play the three black piano keys. In your hunting game described in the last chapter, you may have found some things that were

almost, but not quite right in tone for the three-note scale, and perhaps you may have discovered already that you can change the tones of some things until you make them sound exactly right. Almost everything that has a musical tone can have the pitch of that tone changed in some way. Sometimes it is a very difficult process. For example, it is very difficult to change the tone of a large metal bell; but it can be done. Changing the tone of a glass, a bottle or a cereal bowl, however, is a very simple matter. Here are two experiments which you may find interesting.

Experiment I: Find a tall, thin, drinking glass. Tap the side of it with a pencil or small stick in such a way as to make it give out its best, clearest tone. Get a pitcher or large cup of water. With one hand tap the glass constantly, with the other hand pour water into it until it is nearly full. As you do this, can you hear a change in the tone of the glass? How many changes are there? Try it again and again until you are sure that you know what happens to the tone of the glass. Does the pitch go up or down?

Experiment II: While the glass is full of water, lift it and take hold of it with one hand, just as near the bottom of the glass as you can. Pour the water back into the pitcher and, as you do so, tap the glass constantly with the stick in the other hand, and see what happens to the tone while the water is being poured out. It may be better to have two people do this—one person doing the tapping while the other does the pouring.

Do these experiments give you an idea of how you can use water to make glasses sound right for the tones of the three-note scale? If so, you will be able to tell the missing words in the following sentences:

The more water there is in a glass, the __________ is its tone.

The less water there is in a glass, the__________ is its tone.

The highest note any one glass can make is its tone when entirely__________

The lowest tone any one glass can make is its tone when entirely__________of water. As you see, there are limits to the possible tones of all glasses.

If you should happen to have three glasses that sound nearly alike, one could be left empty for Number 3; you could put a little water in one until it sounds right for Number 2; and still more water in the other one for Number 1. If you have a piano or an organ at home, it would be wise to tune the glasses to match three of its keys. Any three keys that make a three-note scale will do. Take the glass which has the highest tone to the piano, and see which key it sounds most nearly like. If it is exactly in tune with a key, you will know what other keys to match for the lower notes. If it is not exactly in tune with any key, put a little water in it, until it does match one of the keys. In tuning glasses it is better to begin with the highest note and go down-hill in making the scale. Can you see a reason why this should be so?

Glasses that are tuned to match the piano can be used for glass and piano duets. Sometimes three glasses are found that sound almost right and need only a little water in one or two of them to make a perfect 3-note scale.

In making music with glasses there are other things to think about besides the amount of water in them. If one is to get the best tone from the glasses, the kind of tapper that is used is very important, and it also makes a difference what the glasses are resting on.

1

Probably the best kind of tapper is a slender stick with a wooden ball on the end of it. A small block of soft pine may be whittled into a ball about an inch in diameter. A hole may be bored in this, and the stick for the handle glued into the hole. After the glue is dry, sew a piece of felt or other very thick cloth around the ball, so that the wood will not strike too harshly against the glass. (Fig. 1)

Very good tappers can be made by sewing thick cloth around the heel-end of a shoe-tree. (Fig. 2)

Can you find out by experiment, the kind of surface on which glasses should rest in order to have the clearest, most musical tones? Try the tones when the glasses are (1) on the floor, (2) on a rug, (3) on the kitchen stove, (4) on a table with a thick cloth under them.

In tapping the glasses, hold the hammer in the fingers as shown in Figure 3. Tap the side of the glass nearest you, letting the hammer swing out freely and loosely in the hand. Listen to find what part of the glass gives out the clearest tone.

2

When a glass of water stands for several hours, it often happens that air-bubbles form on the sides and bottom of the glass. These bubbles deaden the tone. If the water is stirred until all the bubbles disappear, the tone will be clear again.

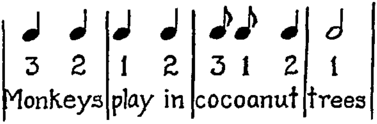
Evaporation is another thing that affects the tone of a water glass, or of any uncovered bowl or dish that has been tuned with water. As you probably know, when water is exposed to the air it evaporates constantly, and unless it is well covered the water in your glass or bowl will diminish in a day or two so you can hear a difference in its pitch. When this happens it becomes necessary to *retune* the glass or bowl by adding enough water to make its tone exactly right again. Like many other musical instruments, a set of water glasses must be tuned very frequently. If you have a set that you keep just for playing tunes, and leave the water standing in them between times, you will need to retune them, probably as often as once a day. Then every time you use them, begin by playing the scale and listen carefully to see if they sound *exactly* right. After a little practice you will be able to tune them very accurately and to hear the difference that a teaspoonful of water, or even less, will make in the tone.

In case you may forget which one of your glasses is Number 1, put a drop of red ink in the water of that glass. The color of the water does not affect the tone and, in playing, it is always a help if Number 1 can be

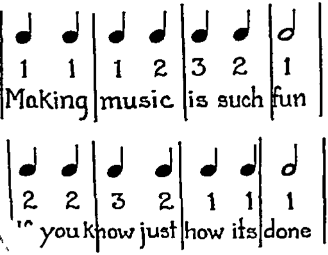
quickly located. Place the glasses so that Number 1 is on the left side as you face them, and Number 3 on the right side.

When you have three glasses tuned to a three-note scale and resting on a thick cloth, with a cloth-covered hammer ready to use, you will probably wish to play many three-note tunes. Here are several songs with both words and tunes, which you may sing as you play.

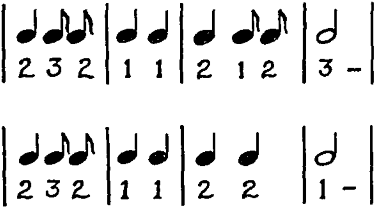
The first is a short tune which the natives in one part of Africa sing over and over—to different words, of course—sometimes for half an hour without stopping. The line of notes shows the rhythm; the numbers show the tune:



This is a song of only one *phrase* or musical idea. The next song has two phrases:



Can you play this tune which has no words? Can you tap the rhythm on your drum or on the table? After you have learned to play it very well, perhaps you could make some words for it.



Do you see how the two phrases match, just as two lines of poetry match? How many measures are there in each phrase? What is the meter? How many half notes in the rhythm? Which notes should be accented? (See page 48.)

In order that you may play all the tunes in this chapter so that they sound just right, be sure that you understand the "shorthand way" of writing down tunes which was first mentioned on page 66. When the shorthand way is used, the line of notes above the numbers is not needed to show the rhythm. Of course every tune has a rhythm of some kind. If the rhythm is even and steady, like the steps of marchers, it may be shown by writing only the number-names of the notes in the tune, and we will have it understood that a plain line of numbers means that the notes are

quarter notes. If there is a half note, a line after the number will show that it is to be held for an extra beat. A whole note will have three lines after the number.

Thus the tune of *Making Music* may be written:

| 1 1 | 1 2 | 3 2 | 1 – |

| 2 2 | 3 2 | 1 1 | 1 – |

and one can see at a glance that all the notes are quarter notes, except the last note of each phrase.

When there are eighth notes in the rhythm, two eighth notes may have a circle around them, to show that the two together take only as long as one of the regular notes.

The tune on page 79 would then be written:

| 2 32 | 1 1 | 2 12 | 3 – |

| 2 32 | 1 1 | 2 2 | 1 – |

Below, on the margin of the page, is a three-note tune with words to the first half only. Would you like to make words for the second half? What kind of note is the last note of each line? This song has six short phrases. Can you locate them?

| 1 2 3 1 | 1 2 3 1 | 3 – 2 2 | 3 – – – |
Harry Johnson, Harry Johnson, How do you do?
| 1 2 3 1 | 1 2 3 1 | 3 – 2 2 | 1 – – – |

The following is a jolly little song called *The Band.* Can you play it well enough to sing it as you play? Can you locate the phrases?

| 1 3 3 2 1 | 1 3 3 2 1 |

Mary, come along, Willie, come along

| 2 2 3 3 | 2 – – – |

Don't you hear the band ?

| 1 3 3 2 1 | 1 3 3 2 1 |

Susie, come along, Bobby come along

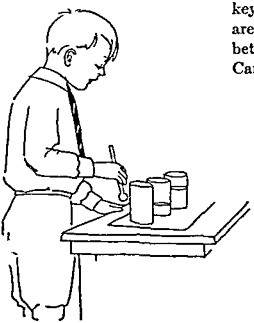
| 2 2 3 2 | 1 – – – |

Don't you hear the band ?

Below is a three-note tune without words. It is very much like one of the tunes on a former page. Can you find the other tune, point out the parts that are alike in the two and tell how they differ?

Try making some three-note tunes of your own. Perhaps you can make a tune for some of the poetry verses you may know. Once a boy made a little book in which to write his own tunes, and in it he wrote *fifteen tunes that could be played on three notes.* He made words for some of them.

So far, we have discussed only one-note, two-note and three-note tunes; but of course you will wish to tune your glasses to play more than three notes. In order to be sure of tuning the glasses properly, we must have some way of telling *how much* higher or lower one note is from another. It is difficult to measure differences in things which we can not see. The voice can slide up and down so gradually that it is not easy to start our measurement with voice tones. But fortunately for us, the makers of pianos and organs have arranged the tones of those instruments so that they are measured off into notes that have very small differences in pitch, in much the same way that a yard-stick is divided into inches. These notes are played by keys arranged close together, and the measure of the difference in pitch from one key to the next key is called a *half-step.* For convenience, some of the keys are white and some are black. Any two keys, white or black, that have no key between them, are a half-step apart, and any two that have one key between them, white or black, are a *whole-step* apart. Can you begin at one end of the piano keyboard and



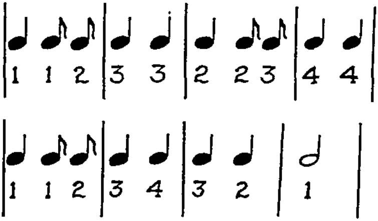
play all the half-steps? Can you go from one end of the keyboard to the other, playing whole-steps all the way?

You have probably noticed that the keys on which you play your three-note tunes are a whole-step apart. No matter whether you play it on black or white keys, the three-note scale has a whole-step between Number 1 and Number 2, and a whole-step between 3 and 4. But the *Four-note Scale* brings a half-step into use, and stops on a note that is only a half-step above Number 3. Play the three-note scale at the piano and then add another note a half-step above Number 3, listening carefully to the tones. Does the half-step give a restful or finished feeling to the end of the scale? A four-note scale—consisting of two whole-steps and one half-step—is sometimes called a *tetrachord*, which is a Greek word meaning "four tones."

Can you find at the piano a four-note scale which needs only white keys? Perhaps the picture at the bottom of this page will help you to find two places on the piano where you can play all the four-note tunes without using black keys. Can you play all the three-note tunes without using white keys?

In adding a fourth note to your glasses, you will be able to tune it more exactly if you know how to sing the four-note scale. Try to sing it, and when you think you have it just right, play it on the piano and see if your ear is correct.

If your four glasses are in tune, play the following melody on them. Try playing it on the piano. You will have no trouble if you find a four-note scale first.



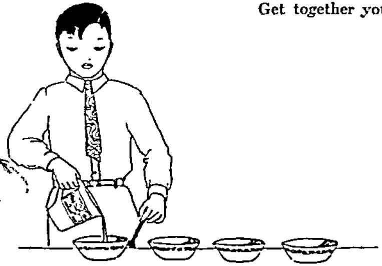
or

| 1 12 | 3 3 | 2 23 | 4 4 |

| 1 12 | 3 4 | 3 2 | 1 – |

For a change, perhaps you would like to tune something besides glasses. How would you like to make a four-note instrument of bowls from the pantry or kitchen? Deep cereal bowls and finger bowls often have very musical, ringing sounds when tapped near the rim with the right kind of hammer.

Get together your musical bowls and find the one



with the highest tone for your Number 4, and the one with the lowest tone for Number 1. Then select two with tones between these. Tune them with water just as you tuned the glasses. You will find that a shallow bowl requires more water to change its pitch than a slender glass requires. The bowls should rest on a thick cloth, in order that their tones may be clear.

Here are a few four-note tunes which may be played on piano, glasses or bowls:

$\frac{3}{4}$ | 1 2 3 | 1 2 3 | 4 3 2 | 3 – – |

| 1 2 3 | 1 2 3 | 4 3 2 | 1 – – |

$\frac{2}{4}$ | 1 2 3 | 2 3 4 | 3 1 | 2 – |

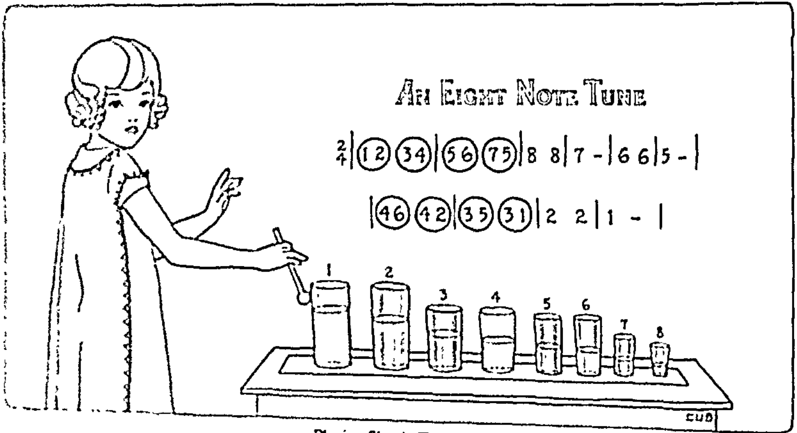
| 1 2 3 | 2 3 4 | 3 2 | 1 – |

$\frac{4}{4}$ | 1 2 3 4 | 4 3 2 1 | 2 – 2 – | 3 – – – |

| 1 2 3 4 | 4 3 2 1 | 2 – 2 – | 1 – – – |

Can you make a four-note tune of your own with two phrases that match as two lines of poetry match?

Can you play your own compositions on glasses and also on bowls?



Playing Simple Tunes

CHAPTER VI

Playing Simple Tunes

After a little experience in playing and composing, no doubt you will wish to play tunes that have more than four notes. When four glasses have been tuned, it will be easy to add a fifth glass if one can be found whose tone is high enough for Number 5 of the scale you have made.

The fifth note should be a whole-step higher than Number 4. This new note added to the four-note scale gives us a five-note scale with these "pitch distances" between the notes:

From 1 to 2, a whole-step
From 2 to 3, a whole-step
From 3 to 4, a half-step
From 4 to 5, a whole-step

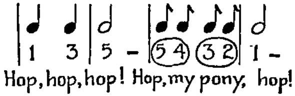
Play the *Five-note Scale* at the piano. Although the four-note scale, or tetrachord, sounds finished on Number 4, the added note makes a pleasing scale which seems to end quite naturally on Number 5. This five-note scale gives a sufficient number of notes for many interesting tunes.

If a glass cannot be found that sounds high enough for Number 5 of your scale, perhaps you can add more

water to the glasses you have already used, and bring their tones down far enough to allow the new glass to be used for Number 5.

Much experimenting with the glasses will help you to become expert in sorting and tuning them to the pitch you need. *Besides,* it is much more fun to find out things for yourself, than always to be told just how they should be done.

Here is a tune of two short phrases, to be played on five glasses:



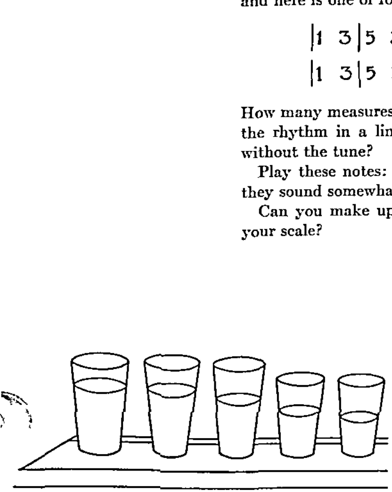
and here is one of four phrases:

| 1 3 | 5 3 | 22 44 | 33 22 |
| 1 3 | 5 3 | 44 32 | 1 – |

How many measures in the song above? Can you write the rhythm in a line of notes, and play the rhythm without the tune?

Play these notes: 1 3 5 3 1 3 5 3 1 3 1—and see if they sound somewhat like a bugle call.

Can you make up bugle tunes using 1, 3 and 5 of your scale?



The following is an old English song and game called *When I was a School-Girl*. Can you play the tune on five glasses?

What is the meter of this song? Which are the accented notes?

$\frac{2}{4}$ | 1 2 3 4 | 5 3 |
When I was a school-girl,
| 4 2 | 3 1 |
School-girl, school-girl.
| 1 2 3 4 | 5 3 |
When I was a school-girl
| 4 2 2 | 1 – |
This way did I.

Have you heard the old German song called *Winter Goodbye?* This is the tune:

$\frac{3}{4}$ | 3 3 2 | 1 – – | 3 3 2 | 1 – – |
| 3 4 5 | 5 4 3 4 | 2 3 4 | 4 3 2 3 |
| 3 3 4 | 5 – – | 3 3 2 | 1 – – |

Can you play the rhythm on your drum? Can you play the tune on glasses, accenting the proper notes, and singing the numbers at the same time?

Lightly Row

4/4 | 5 3 3 – | 4 2 2 – | 1 2 3 4 | 5 5 5 – |
Lightly row, lightly row; O'er the glassy waves we go;

| 5 3 3 – | 4 2 2 – | 1 3 5 5 | 3 – – – |
Smoothly glide, smoothly glide, on the silent tide.

| 2 2 2 2 | 2 3 4 – | 3 3 3 3 | 3 4 5 – |
Let the winds and waters be mingled with our childish glee;

| 5 3 3 – | 4 2 2 – | 1 3 5 5 | 1 – – – |
Sing and float, sing and float, in our little boat.

The song on the opposite page is a well-known German folk-song which may be played on five notes. And here is another old German folk-song:

Spring Song

$\frac{3}{4}$ |5 – 3 | 5 – 3 | 2 1 2 | 1 – – |
Cuckoo! Cuckoo! calls from the wood;

| 2 2 3 | 4 – 2 | 3 3 4 | 5 – 3 |
Come let us sing and dance and be merry!

| 5 – 3 | 5 – 3 | 2 1 2 | 1 – – |
Cuckoo! Cuckoo! calls from the wood.

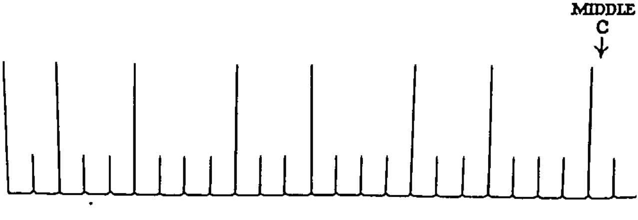
Do you know the tune of the old singing game, *Oats, Peas, Beans and Barley Grow?* If so, can you find out for yourself how to play it on five glasses, or on five notes of the piano?

If you have a piano, it would be well to tune your glasses to match it, and perhaps there can be piano and glass duets. You may play all your tunes also on the piano, and take a turn at the piano in playing duets. The rest of this chapter will consist mainly of a discussion of the piano keyboard, in order that you may learn how to find all your tunes and how to play them in several places on the piano or on the organ.

The pictures at the bottom of this page and the next show a piano keyboard. You will notice that it is made up of a row of white keys and a row of black keys, with the black keys arranged in groups of two and three. These groups of black keys help us to find quickly the keys we want to play, and also help to divide the long keyboard into sections.

The last key on the right side gives a very high note, almost as high as the chirp of a cricket, and the last key on the left side gives a very low note, almost as low as the roll of thunder. Between these two notes—the highest and the lowest—there are really hundreds of different pitches that can be sounded; but the makers of the piano have used only about eighty-eight tones in all, from the lowest to the highest note, and some pianos have still fewer tones. As you will remember, these divisions of the keyboard are called "half-steps." (See page 82). Have you played all the half-steps on the piano from one end to the other? A scale of nothing but half-steps is called the *Chromatic Scale.* Play a chromatic scale of twelve notes and see if you like the sound of it.

Play one key of the group of three black ones, then find the one that corresponds to it in the next group of three black ones, and play it. You will notice that they sound much alike, and if you play the two together, they sound almost as if one note were being played. How many half-steps are there between these two notes? The pitch distance between them is called



an *octave*. Play a white key between the two black keys, and find the key that is one octave above it. Two octaves above it. One octave below it. Can you find an octave above, and an octave below any key? You could find the octave of any key by counting the half-steps, but it is much easier to find it with your eyes, matching keys that look alike.

You will also remember that a whole-step is the pitch distance from one key to the second key above it or below it. A scale with nothing but whole-steps may be called the *Whole-step Scale*. It is often called the *Whole-tone Scale*. Start on any key you like, play a whole-step scale for two octaves, and see if you like the sound of it.

The three-note scale, as you know, is made of two whole steps. Can you play the three-note scale starting on any key, black or white? If so, you can play all the three-note tunes in this book in a dozen different places on the piano.

Can you find a four-note scale of two whole-steps and then a half-step, starting on any key? Then try your four-note tunes in different places on the piano.

Add a whole-step to the four-note scale, and play the five-note scale, starting on any key.

The half-steps are divided so evenly that you can start on any key of the piano and play any tune you wish. If three things are remembered, the tune will sound right: (1) the right key for each number of the scale, (2) the numbers in the tune, and (3) the rhythm of the tune.

Can you play "When I was a School-Girl" in several different ways on the piano, by starting on different keys? In how many places can you play it? There are only twelve different ways. If you can play all these, you can play the piano while someone else plays the glasses, no matter which key was used for Number 1 in tuning the glasses.

It is easy to play five-note tunes on the piano when you have found the right keys, for you have five fingers that will fit the five keys. *You can make each finger* take care of its special key, and play it when its turn comes in the tune. You can number your fingers as shown in the picture on the next page, and place them over five keys ready to play.

When you are able to play the five-note scale from any key of the piano, find one whole-step above Number 5 and you will have the *Six-note Scale.*

"*Lavender's Blue*" is a song for a six-note scale. You will find the tune and the words of the first verse below on the margin of the page. Here are the other two verses:

2. Call up your men, fiddle diddle,
   Set them to work,
   Some to the plow, fiddle diddle,
   Some to the cart.

3. Some to make hay, fiddle diddle,
   Some to cut corn,
   While you and I, fiddle diddle,
   Keep ourselves warm.

$\frac{3}{4}$| 1 5 5 | 5 4 3 2 1 | 1 6 6 | 6 - - |
Lavender's blue, fiddle diddle, Lavender's green;

| 1 5 5 | 5 4 3 2 1 | 4 3 2 | 1 - - |
When I am king, fiddle diddle, You shall be queen.

Have you made a six-note scale of glasses? By the time you have six glasses in a row you will probably feel the need of marking something besides Number 1. If you have used red water in Number 1, you can put blue water in Number 4, using either bluing or blue ink for coloring. With these two colored glasses you can quickly locate any one of the set you wish to play.

Here is another folk-tune which you may play on six glasses:

$\frac{4}{4}$ | 1 2 3 4 | 5 6 5 – | 4 5 4 – | 3 4 3 – |
| 1 2 3 4 | 5 6 5 – | 4 3 4 2 | 1 – – – |

Can you devise some way of arranging the fingers of the two hands, so you can play six-note tunes on the piano comfortably and without getting the fingers in each other's way?

Play the six-note scale at the piano, and then add another note a whole-step above Number 6. This note will be Number 7. Do you like the scale when it stops on this note? Number 7 sounds as if it leads up to another note and will never be satisfied until the next note is sounded! Can you find the note at the piano that makes Number 7 sound finished? Is it a half-step or a whole-step above 7? This will be the Number 8 of our long scale. How far is Number 8 from Number 1, counting in half steps? What other way of measuring the distance do you know?

The last note of an *Eight-note Scale* is always an octave from Number 1, and the two notes not only look alike on the keyboard, but they sound much alike, and blend perfectly when they are played together. The word octave means "eight notes."

Can you find the place on the piano where the eight-note scale sounds exactly right without using any of the black keys?

Sometimes several people play the piano at one time, all playing the same tune in different octaves. Can you get together enough people to play "Lavender's Blue" in four different octaves on the piano?

Have you six glasses tuned to the piano, so you can make a regular orchestra?

All the pieces you have learned may be played on the piano or on the organ in several octaves at once, if different people can join in the playing, keeping the notes and the rhythm exactly together.

Can you play the eight-note scale beginning on any key of the piano? Perhaps it would be easier to do this if we make a plan of the different intervals, or distances between adjoining keys:

Between 1 and 2, a whole-step.
Between 2 and 3, a whole-step.
Between 3 and 4, a half-step.
Between 4 and 5, a whole-step.
Between 5 and 6, a whole-step.
Between 6 and 7, a whole-step.
Between 7 and 8, a half-step.

If you will compare them you will see that the intervals from 5 to 8 are exactly the same as those from 1 to 4. From 1 to 4 is a tetrachord (see page 83), therefore from 5 to 8 is also a tetrachord of exactly the same kind. So if you begin with Number 1 and play a four-note scale, or tetrachord, and then play another tetrachord starting on Number 5, you will have your eight-note scale exactly right.

There was a time, long ago, when people had only a short scale of one tetrachord, but it was afterwards learned that two tetrachords could be joined together with a whole-step between them, thereby making a very pleasing scale which ended exactly an octave above its starting place.

This scale is called the *Diatonic Major Scale.* It is the scale that most people know best of all, and more of the songs we know are built on this scale than on any other. Many people can sing the numbers of the scale by the Italian names: *Do, Re, Mi, Fa, Sol, La, Ti, Do.* You have probably heard the scale sung in this way.

The distance from 1 to 8 in the diatonic major scale may be measured in four ways: by the octave measurement, by tetrachords, by whole-steps and by half-steps. How many of each are there?

Several hundred years ago, when people first gave alphabet names to music notes, they knew that every eighth note sounded like the first one, so they decided to use only seven letter-names, and to use them again and again as higher and still higher notes were reached.

If you will begin at the lowest note of the piano and count the white keys only, their names will run in this order all the way up the piano:

A B C D E F G A B C D E F G A B C D E F G.

From A to the next A is an octave; from B to the next B, another octave, and so on. The arrangement of the black keys makes it easy to find all the other different keys. For instance, D is always between the two *black keys of the 2-black-key group,* no matter in what part of the piano it is found. Can you find all the D's on the piano? A is always the white key between the second and third black key of the 3-black-key group. How many A's are there in the pictures of the keyboard on pages 92 and 93? Find all the C's; all the F's; *all the E's; all the B's.* The C *which is near the middle* of the piano is called *Middle C.*

The black keys have no names of their own, but take the names of their neighbors. Each black key takes the name of both his neighbors. When it takes the name of its neighbor on the left it is called a *sharp* and when it takes the name of its neighbor on the right, it is called a *flat.* The black key that lies between G and A is sometimes called G-sharp and sometimes A-flat. The black key above C may be called either C-sharp or D-flat. This is the sign for a flat, ♭, and this is the sign for a sharp, ♯.

Can you give the sharp and flat names of each black key on the piano? See if you can play your favorite 3-note tune using C ♯ for Number 1.

Play your favorite four-note tune, using A for Number 1. Play a five-note tune, using F for Number 1. Play Lavender's Blue, using D for Number 1. The white keys are called *naturals*. If you play all the white, or natural keys from C to the next C and back again, you will hear a diatonic major scale, the one which was discussed on page 97. It is often called just "the major scale." The major scale can be played starting with any key on the piano. If the scale is started on C, it is called the scale of C major; if it starts on F, it is the key of F major. Whatever key it starts on, that is the name of the scale.

Write out the letter names of the notes in the scale of C major, in the order in which the keys come in the scale. How many black notes are needed in the scale of G major? You will remember that every black key has two names. Write out the names of the notes in that scale, and see if you think the black key should be called F-sharp or G-flat. In a diatonic scale every letter from A to G is supposed to be included in the list of letter names, and each letter is supposed to come once in the octave. What would happen to the order of the letter names if the black key were called G-flat?

How many black keys do you need to make the scale of A major sound right? Can you name the black keys correctly? Can you play separately the two tetrachords that make this scale? Play the two tetrachords that make the scale of D major.

Robin Hood and Little John

$\frac{4}{4}$ | 1 12 3 34 | 5 5 5 67 | 8 5 56 54 | 3 – 1 – |
Robin Hood and Little John, They both are gone to the fair, O;

| 1 12 3 34 | 5 5 5 67 | 8 5 56 54 | 3 – 1 𝄽 |
We will to the sweet greenwood To see what they do there, O.

| 6 6 6 54 | 3 5 5 67 | 8 5 56 54 | 3 – 1 𝄽 |
For to chase the buck and doe, To chase the buck and doe, O.

| 6 6 6 54 | 32 34 5 67 | 8 5 56 54 | 3 – 1 – |
For to chase the buck and doe, With a heart that's blithe and gay, O.

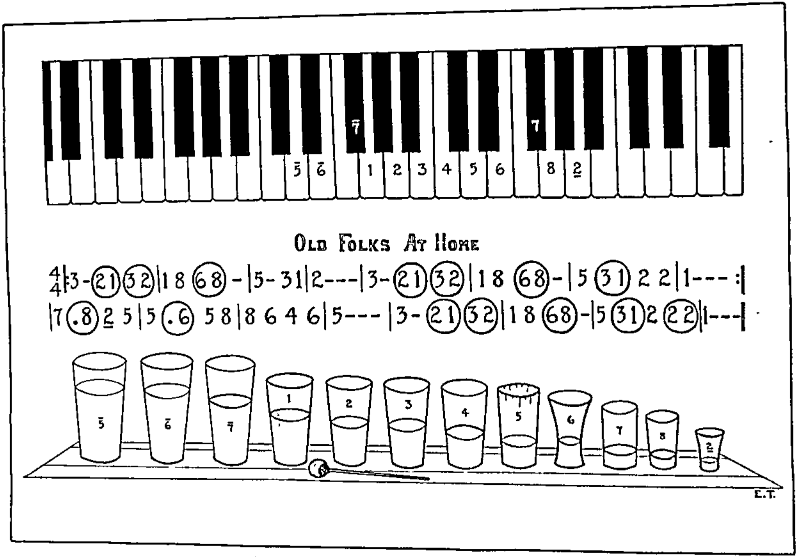
How many black keys are in the scale of F major? Name all the notes in this scale, and see what the black key should be called. What are the black keys that come in the scale of B♭? Can you write down the letter names of the two tetrachords that make the scale of E♭?

When the letter names were first given to the notes, before the piano was invented, the seven notes of our ordinary scale were called, A, B, C, D, E, F, G. But in those early days, the names got changed around a bit, and for some reason people began to call the first note of the natural major scale C, instead of A; and to this day the notes of our natural scale are named C, D, E, F, G, A, B, and C is Number 1 instead of A. It may seem a little strange to have our natural major scale start on C instead of A, but since pianos are made that way we shall have to get used to it.

On the opposite page is an old English song which can be played on eight notes. Can you tune eight glasses and play this song on them?

In finding enough glasses to make an eight-note scale, it will probably be necessary to have glasses of several sizes. Since Number 1 has red ink in it, Number 8, its octave, should also be red. (See picture, page 97.)

At the bottom of this page is the tune of a Russian Christmas song, called *Kolyada,* which can be played on the notes of one octave. Can you play it at the piano in the key of G? In F? Can you find the scale of D and play the tune in that key?



Melodies for Many Glasses

CHAPTER VII

Melodies for Many Glasses

THE key of G is a very good key to which the glasses may be tuned. If you are fortunate in finding glasses with different tones, you may have eight glasses tuned to the eight-note scale—G to the G above it—and several notes below the Number 1 also. Many songs go below Number 1, using notes that are in the octave below it. Play *Yankee Doodle* with G as Number 1. Before the tune has gone far, it dips down to D in the octave below; so if you are playing this tune on the glasses, you will need three glasses lower than Number 1. The new notes needed will be Numbers 5, 6 and 7 of the low octave.

In writing these low notes, each one may be written underneath a straight line, to show that it is in the octave beneath the main octave. Your complete set of glasses would then be numbered:

$$\overline{5}\quad \overline{6}\quad \overline{7}\quad 1\quad 2\quad 3\quad 4\quad 5\quad 6\quad 7\quad 8$$

If you should find some very high glasses and wish to make the set still larger, you could call the high

notes by the same numbers, and write them *above* a straight line, to show they are above the main octave. The set could then be numbered:

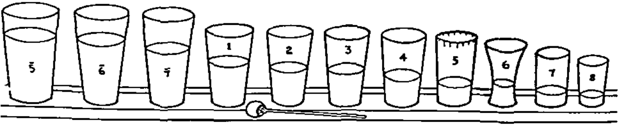
$$\overline{5}\ \overline{6}\ \overline{7}\ 1\ 2\ 3\ 4\ 5\ 6\ 7\ 8\ \underline{1}\ \underline{2}\ \underline{3}\ \underline{4}\ \underline{5}$$

Be sure that you color the water in each Number 1 and Number 4, so you can see at a glance the number you wish to strike.

In arranging the set of glasses, one must remember that each glass can be used only for certain tones, and it is well to study the possibilities of your glasses, so you can make the best arrangement of them. This is one way to manage it:

Buy some clear-sounding drinking glasses at the ten-cent store. Try to find some with low tones, some with high, and some with medium tones. Bring all of the glasses together, still empty, tall ones and short ones, big and little ones, and arrange them *in a row according to the pitch of their natural tones* when they are empty, the highest at one end, and the lowest at the other end.

The highest tone you can possibly have in your set is the natural tone of your highest glass, for you can not make it any higher. See what that tone is by testing it at the piano, and write it down. Now take *the lowest-toned glass,* and fill it with water, as full as it can be and still have a clear tone when it is



struck. This is the lowest tone you can have in your set. Match this tone at the piano, and remember the key or write it down.

Let us suppose you have 15 glasses in a row, with the highest at one end, and the lowest at the other end. Let us also suppose that your highest note is E, and the tone of the lowest glass full of water is E, one octave below the high one. In that case, you cannot have more than an eight-note scale. But do not be discouraged; maybe you can make two short sets instead of one long one, and that will give you an opportunity to have glass duets if the two sets are tuned alike.

Maybe you could manage the collection so as to make one eight-note set and one six-note set, or perhaps three five-note sets tuned together, and have a glass trio! It all depends on how well you can experiment and think up new ideas of arranging the glasses.

Suppose you have two or three glasses with very high tones, and no others with tones that come at all near these. In that case the very high tones cannot be used except to start another scale—a high one. Often jelly glasses with high tones have to be discarded because there are not glasses with tones high enough to lead up to them. Sometimes they may be used to make a short three or four-note scale an octave above the main scale.

A very useful set is one of eleven glasses, consisting of one octave and three notes of the octave below.

Early One Morning

$\frac{2}{4}$ | 1 1 1 | 13 5 5 | 6 4 2 1 | $\bar{7}$2$\bar{5}$ |

Early one morning, before the sun had risen,

| 1 1 1 | 1 3 5 5 | 6 4 2 $\bar{7}$ | 1 – |

I heard a blue-bird in the fields gaily sing;

| 2 3 4 | 53 1 | 2 3 4 | 53 1 |

"South winds are blowing, green grass is growing,

| 13 5 8 | 76 5 4 | 32 1$\bar{7}$ | 1· – |

We come to herald the merry spring.

One or two notes of the higher octave will also be useful for some songs that go above Number 8. *Swanee River*, for instance, goes to Number 2 in the octave above the main octave, and *Dixie* goes to Number 3 in the octave above.

If you could find enough glasses for a scale of fourteen or fifteen notes, tuned from Number 5 in the octave below the main octave, all the way up to Number 4 or 5 in the octave above the main one, you could play almost any song you know that does not have "accidentals" in it. Sometimes a song has in its tune a sharp or flat that does not belong in the regular scale. This is called an *accidental.* If your song has an accidental in it, perhaps you can find an extra glass which can be tuned for that note, and place it behind the row of regular scale-note glasses.

The tunes in this chapter have no accidentals in them, and they may be played either on glasses or on piano keys.

The one on the opposite page is that of an old English song. Can you play it and sing the words at the same time? Here is the second verse:

One autumn afternoon, just as the sun was setting,
I heard a blue-bird in a tree pipe a song:
"Farewell, we're going, cold winds are blowing,
But we'll be back when the days grow long."

The song below comes from Germany.

Flow Gently, Sweet Afton

$\frac{3}{4}$ $\bar{5}$ | 1 1 32 | 1 1 $\bar{5}$ | $\bar{6}$ 1 $\bar{6}$ | $\bar{5}$ –

Flow gently, sweet Afton, a mong thy green braes,

$\bar{5}$ | 1 1 2 | 3 3 5 | 5 3 1 | 2 –

Flow gently, I'll sing thee a song in thy praise;

$\bar{5}$ | 1 1 32 | 1 1 $\bar{5}$ | $\bar{6}$ 4 $\bar{6}$ | $\bar{5}$ –

My Mary's a sleep by the murmuring stream,

$\bar{5}$ | 1 1 2 | 3 $\overset{\frown}{\bar{5}}$ 4 | $\bar{5}$ $\bar{5}$ $\bar{7}$ | 1 –

Flow gently, sweet Afton, disturb not her dream.

And here are two little French tunes. The first can be played on a set of only six glasses, if we tune them to Numbers 1, 2, 3 of the main octave and 7, 6, 5 of the octave below.

PIERROT, a French Folk-tune.

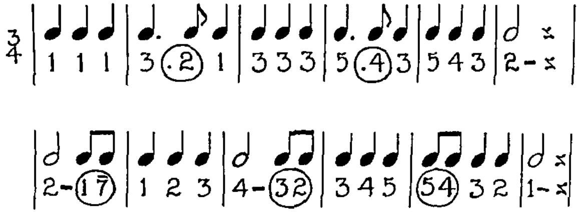
$\frac{4}{4}$ |1 1 1 2 |3 - 2 - |1 3 2 2 |1 - - - |
1 1 1 2	3 - 2 -	1 3 2 2	1 - - -
2 2 2 2	$\bar{6}$ - $\bar{6}$ -	2 1 $\bar{7}$ $\bar{6}$	$\bar{5}$ - - -
1 1 1 2	3 - 2 -	1 3 2 2	1 - - -

A French tune of five notes

$\frac{3}{4}$ 3|1 - 2 |3 1 3 |1 - 2 |3 1 3 |
|5 - - |3 1 2 |1 - | Repeat.

Do you notice that the first note of the music in the second tune is outside the first bar line? This means that the first note is a weak beat, and the accent comes on the second note. Play the tune and make all the accents in the right places. *Flow Gently, Sweet Afton* is another song that starts on an unaccented beat. The new sign used in the last line is a *pause* showing that the note under it should be held longer than the others.

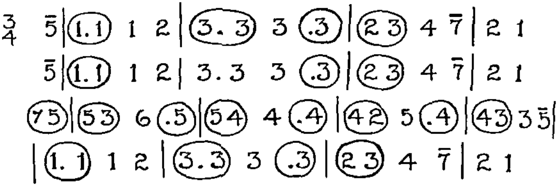
If I were a Bird



The Pine Tree

Rhythm

Tune



The two songs on the opposite page are old German folk-tunes. In the second measure of *If I were a Bird* you will see how the dotted note is shown in our simple short-hand way of writing tunes. You may recall that dots were discussed in Chapter III. (See page 51.) The circle is put around the dot and the note which follows, to show that the dot and the eighth note together last for one full beat.

Notice the dotted notes in the tune on the lower margin of this page. It is the tune of a German song called *Liebe Augustine.* Can you make words of your own to fit it?

Sometimes the dotted note and the note after it both come in the same circle. For instance, in this rhythm

where the dotted note is shorter than one regular beat, the notes would be written thus:

1.1 1 1

In the old German song called *The Pine Tree,* the rhythm is shown first and the tune is written below it.

In the beginning of the second line, a dotted eighth note and a sixteenth note together fill one beat. In this tune, which is the first accented note?

A Spring Song

$\frac{4}{4}$ | $\bar{5}$ 1 $\bar{7}$ 1 | 21 23 2 – | $\bar{5}$ 1 $\bar{7}$ 1 | 2 – 1 x |
Hark, the tiny cowslip bell In the breeze is ringing

| $\bar{5}$ 1 $\bar{7}$ 1 | 21 23 2 – | $\bar{5}$ 1 $\bar{7}$ 1 | 2 – 1 x |
Birds in every woodland dell, Songs of joy are singing

| 3 21 2 – | 3 21 2 – | 3 23 43 23 | 43 21 2 – |
Winter is o'er, Spring once more Spreads a broad her golden store

| $\bar{5}$ 1 $\bar{7}$ 1 | 21 23 2 – | $\bar{5}$ 1 $\bar{7}$ 1 | 2 – 1 x |
Hark, the tiny cowslip bell, In the breeze is ringing.

On page 50 you read about different kinds of meter for beating drum taps. *How many eighth notes are needed to fill a measure in six-eight meter?* How many eighth notes are needed to fill a measure in three-four meter? In four-four meter?

At the bottom of this page is a Flemish song in six-eight meter. In this meter the pulse is measured by eighth notes instead of quarter notes. Therefore in writing the number notation of tunes in six-eight meter, an eighth note is shown by a plain number, and a quarter note is shown by a number with a line after it, as you will see in the song below.

The letters D. C. stand for the Italian words *Da Capo* which mean "from the beginning." They are used to show that the player is supposed to go back to the beginning of the piece and play down to the word *Fine*, a word used to show where the piece ends.

Have you composed tunes that make use of all the glasses in your set? And have you preserved your compositions in a book? Could you select the rhythm of some song in this book and make a new tune which exactly fits that rhythm?


Bird Songs
46 46 46 46 - 462
31- 31- 31

CHAPTER VIII

Bird Songs

NO sounds in the world of Nature are more delightful than the songs of birds, and few things are more interesting than a careful study of their music. How different the world would be if there were no bird voices in our meadows, fields and forests! Even the city parks would be sadly changed without them.

There are many people who notice the bright feathers of birds, hear their songs and enjoy them, no doubt, but who seem to take birds for granted, and never stop to consider the marvel of their wonderful gifts. Some of these tiny creatures—smaller than your hand perhaps—can perch up in a tree-top any spring day and sing beautiful tunes that few people can imitate, even with the help of many instruments! These talented singers may look on human musicians and their music very much as we look on clumsy elephants and their snorting. Many of the powers of birds are quite beyond our understanding, and music lovers will find the feathered songsters a most interesting field of study.

The Drummer Birds.—In Nature's feathered orchestra, some of the musicians furnish the tunes, and some of them play instruments of rhythm without a tune. The *Woodpecker* is one of the best known rhythm

beaters among the birds. Perhaps you have not thought of him as a musician; but if you will watch him as he walks up and down the side of a tree, you will see him from time to time brace himself with his stiff tail and tap the bark as if to see that his tree-drum is in tune. Then if you listen to his taps, you will realize that he has a feeling for rhythm, and is an expert in the handling of his sharp-pointed drumstick. When he beats a tattoo on the trunk of a dead tree or on a telephone pole, the sound is like that of a kettle-drum. He seems to have a sense of humor, too, for sometimes he beats his drumstick on the tin gutters and roofs of houses, just for the fun of the rattling noise it makes.

Downy Woodpecker

The *Partridge* is another bird who beats a rhythm without a tune. His drumming is one of the most interesting sounds of spring, and is truly a wonderful performance. Not many of us ever see him beat his drum, for, unlike the woodpecker, he is very shy about beating it in public. He has no instrument except his own stiff wings and the air between his wings and body. He stands up very erect on a log or a stump, gives a few blows with his wings, pauses a moment, then goes at it again, beating the air faster and faster with a loud, booming sound, until he appears to be a mere blurr of feathers. Long before he finishes, it seems impossible

that he should have an ounce of energy or a feather left. Indeed he does sink down exhausted, but in a few minutes he is ready to begin all over again.

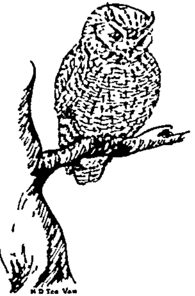
The *Prairie Hen* is another bird that plays an instrument of rhythm. At the base of the neck, on either side, the cock bird has a yellow air sac that looks somewhat like an orange. When he wishes to call the other cocks of the neighborhood to come and have a tournament, he presses the air out of these sacs with a deep, booming sound. Soon the other cocks assemble, each one booming his loudest. When all have come together, they wrestle while the hens look on admiringly.

The *Hummingbird* makes a delightful whirring with his wings as he poises his body before a flower and dips his long bill down for the honey. Can you think of a way to make a sound like that of the hummingbird's fluttering wings?

Perhaps you can imitate some of the other bird rhythms on your drum.

Shouting Birds.—Calls and cries, as well as rhythms, have their part in Nature's orchestra. Who is there who has slept in the woods at night, and has not heard the hooting of the *Owl?* When he sends his voice across the dark, we wonder what may be the thoughts behind those strange sounds. When the

Barred Owl startles us with his deep, resonant horn, "Whoo-whoo-whoo! Wh-whoo! To-whoo-ah!" or the *Screech Owl* makes our flesh creep with his shivery cry, or when the *Barn Owl* lifts his blood-curdling yell, we suspect that these are really hunting calls. The voice of the screech owl trembles down the scale as he shouts "It's c-o-l-d!" for all the world as if he were shivering to death. The *Great Horned Owl* has a voice like the sound of a steamer whistle, "Whoo-hoo-hoo! Whoo-hoo-hoo-hoo!" And, oh, his scream!



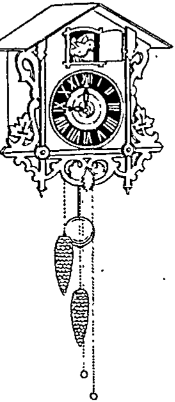
Screech Owl

The harsh voice of the *Crow* is far from musical, but it is loud and healthy. We are familiar with his "Caw, caw!" and most people can imitate it perfectly. As he takes his way across the cornfields, the slow flap of his wings often gives a rhythmic accompaniment to his call. Though he is but a poor musician, and is greatly disliked by the farmers, the crow is a very clever and interesting fellow. Many people think he is the most knowing bird in America.

The crow's handsome relative, the *Blue Jay*, may be called the family beauty. He is a noisy rascal, boisterous and jolly, and often very ill-behaved. His voice is much more musical than the voice of the black crow. We have all heard his "Jay, jay!" or "Tideurt, tideurt!" as he jumps about in a tree near the house. He is a great mimic, and tame jay birds have been taught to imitate the songs of other birds. Can you imitate the call of the blue jay? The crow? The owl?

Two-note Singers.—Birds, like men, seem to show several stages in the development of their music. Some birds beat rhythms only; some shout on one tone, or perhaps let their voices slide around with no real aim. There are several birds that sing mainly on two notes, and seem to be unable to add another to their tunes; there are some that sing three or four notes, and others that use every note within an octave—and more—before their songs are finished.

The birds of the cuckoo family show several stages of musical ability. The *Yellow-billed Cuckoo*—called "Rain Crow" in some places, and elsewhere the "Wood Pigeon"—gives only clear, rhythmic sounds that one listener has described as being like "the sound of a loose-mouthed hound lapping from a pan of milk." His cousin, the *Black-billed Cuckoo*, has a voice that is developed a little further. He sings no real tune and his song is mainly on one pitch, but his tone is more musical and he follows a distinct rhythmic pattern. He sings two notes, then rests for a beat, two more notes and another rest. Sometimes he varies it by giving three notes and a rest. He seems to say "Cuckoo!" or "Cu-cuck-oo!" and this is where he gets his name. The rhythmic pattern of his song is something like this:



Sometimes he changes the pitch and sings the last syllable of the word in a little lower tone. American cuckoos, however, have not yet learned to divide their tones into distinct pitches.

The *European Cuckoo* sings two separate notes to perfection, and his song is known the world over:

3 1 x 3 1

Cuck-oo Cuck-oo

Sometimes he rests longer between the notes and sings:

3 1 x x 3 1 x x 3 1

Cuck-oo Cuck-oo Cuck-oo

It is this song that has made the cuckoo family famous. *For hundreds of years poets have written of the cuckoo's* call in their poems about spring, and musicians have made use of it in songs and instrumental music. The Swiss clock-makers imitate the cuckoo's song very cleverly. Have you heard a cuckoo clock?

Play the cuckoo song on your water glasses. If you have a set of eight glasses tuned to the major scale, you will find you can play this song in more than one place in the set. Find out how many places there are where it sounds just right.

In how many keys can you play it on the piano? How many whole-steps between the two notes?

Sometimes the cuckoo changes his song a little, and sings 3-*flat* 1, with only a step and a half between the two notes. This may be called his *minor* song. Can you find a minor cuckoo song on the piano? You will find that you can play it in three places on your set of glasses. Here is one way:

.8 6 ⨯ 8 6

Cuck-oo Cuck-oo

Can you find the other two ways?

The *Quail* is another bird whose song consists of but two tones. He gives a clear whistling call "Bob White! Bob White!" that is one of the most cheerful sounds in Nature. The cuckoo sings his high note first, but the quail, or "Bob White," as he is often called, gives his low note first, then leaps up to the high one. Sometimes he sings 1 4 - 1 4 -; sometimes 1 5 - 1 5 -; and often his tone rises from 1 to 6. At times his second note almost reaches the octave above the first one. He often sings his first note twice before he takes the high one, thus:

1 1 4 - 1 1 4

Bob Bob White! Bob Bob White!

The interval from 1 to 4 is a very common one for him to use.

Sometimes we may hear two Bob Whites calling to each other in the twilight of a summer evening. Then we can imagine they are saying,

"Bob White! Peas ripe?"
"Not quite. Come again tomorrow night."
"All right, Bob White!"

But their conversation does not usually stop there. They never seem to tire of the tune, and sometimes they call a hundred times without stopping.

Can you play the Bob White song on your glasses? Can you whistle his tune? It will sound more nearly like the real bird song if you can whistle it.

Have you noticed the song which a *Hen* sings as she goes about the barn-yard? When she is happy she often sings a song of two notes that sounds as if she were saying:

1 4 – 1 4 4 4 4
O ark! O ark, ark, ark, ark!

Sometimes she goes up to 6 for a long line of "arks" before she comes down to number 4 again. The next time you hear a hen sing, try to write down her song in numbers; then listen again, and see if she sings the same song every time. When she is frightened, or when she has laid an egg and wishes the world to know about it, her song is quite different. It then becomes a "cackle," somewhat like this:

1 1 1 1 5 1
Cut – cut – cut – cut – aw – cut!

While you are listening to the songs and cackles of the hen, you might also try to catch the notes of the *Rooster's* crowing. Do his notes spring up or down, and how far? Does he sing an octave, or is the leap he makes even more than an octave?

The little *Black-capped Chickadee* is one of the most popular of our familiar birds. He stays with us all the year 'round, is a most useful citizen and a great friend to the farmer and gardener. His simple little song is very pleasing.

3 3 1 1 3 3 1 1
Chick-a-dee-dee, Chick-a-dee-dee!

Sometimes he seems to say

2 1
Phoe-be

or perhaps

2 1
Ear-ly!

Few wild birds are as sociable and responsive as he is. If you whistle to him, he is almost sure to answer you, and he may even imitate you! He may sometimes be persuaded to eat from your hand.

The *Oven-bird,* or *Golden-crowned Thrush,* builds a nest in the woods among dry leaves or pine needles, making it in the shape of an old-fashioned clay oven

such as the Indians used long ago. This is how the bird gets its name. Walking through the woods some day, we may hear him call,

4 1 4 1 4 1

Preacher ! Preacher ! Preacher !

The word being repeated very rapidly, and growing louder and louder with each repetition. Some people think he says "Teacher!" and others hear him say "Queecher!" His usual tune is a rapid 4 1 4 1 4 1 4 1, though he sometimes sings a more elaborate melody.

The *Sparrows* form the largest of all bird families. At least forty-two different kinds are to be found East of the Rocky Mountains and other varieties live further West. Among them are singers of various stages of musical ability, from the chipping sparrow whose "Chip, chip, chip" can hardly be called a song, to the song sparrow, who is one of our best musicians. All of the members of the family are small with dull brownish coloring, which varies in different sparrows, and keeps them from being easily seen on the ground.

Everyone knows the friendly little *Chipping Sparrow*. He is only a beginner in the art of singing, and his tones are not always pitched on a musical note. His words are "Chip, chip, chip!" A good imitation of his voice can be made by giving three or four rapid taps on the side of a very high-pitched jelly glass.

The *White-throated Sparrow* has reached a more advanced stage in his musical development. He sings boldly two clear notes of definite pitch, and his song, which is remarkable for its rhythm and its pure tones, has made him one of the most distinguished members of his family. When once his song is distinctly heard it is not to be forgotten, and anyone who whistles may imitate it. The words sound so much like "Old Sam Peabody, Peabody, Peabody!" that he is often called the "Peabody Bird." But some people translate them differently and think they hear him say "All day whit-tl-in', whit-tl-in', whit-tl-in'," or perhaps "All day long fid-dl-in', fid-dl-in', fid-dl-in'!" and still others think he says "O hear me, Theresa, Theresa, Theresa!" In any case, he first sings three—sometimes two—long notes of equal length, and then three clusters of three short tones each. His rhythm is plainly

and his notes may be:

1 5 5 5. 5 5 5. 5 5 5. 5 5

Often his interval is only a fourth, and he sings:

1 4 4 4. 4 4 4. 4 4 4. 4 4

If you whistle the White-throat's call accurately, he will sometimes come to you in answer to it, for he has a great deal of curiosity. His song will be easy to play on the glasses and easy to remember.

Have you noticed how many of the two-note singers use the interval of a fourth in their songs?

The hen sings "O ark! Ark, ark, ark, ark, ark, ark, ark, ark!" on 1 and 4.

The quail sings "Bob White, peas ripe?" on 1 and 4.

The oven-bird says "Preacher, preacher, preacher!" on 1 and 4.

The white-throated sparrow sings his "fid-dl-in'" song on 1 and 4.

The rhythms of these four songs are given on the margin of the page, below. If we compare them we will see that it is mainly the rhythm that makes them different, for the two notes, 1 and 4, are the same in all of them. So it is important to know the characteristic rhythm of each bird song before it can be well imitated. Can you tap these rhythms on your drum? Can you whistle each of the four songs given above in its exact rhythm?

As you doubtless know, whistling is the best means of imitating any bird song, for bird songs are usually pitched very high,—much higher than your singing voice, and probably higher than the tones of your glasses. It is also true that a whistled note has more of the tone quality of a bird's note than most instruments can give.

Many bird songs are surprisingly high in pitch. Have you ever whistled a perfect imitation of a bird's song, and then tried to find notes at the piano which exactly matched the tones of your whistling? If so, you probably found that they were somewhere among the highest notes of the piano. When the numbers of bird songs are given, it is usually understood that the tune is to be pitched in a very high key.

Small, thick glasses—jelly glasses, for example—have much higher tones than thin glasses; and a set of such glasses tuned to the major scale in a very high key would be well suited to these simple bird songs. The highest keys of the piano may also be used.

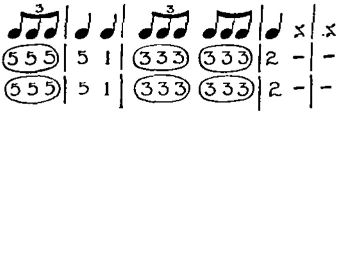
Singers of Varied Tunes.—The bird musicians who sing real melodies, and who vary their tunes from time to time, make an appeal to us that is like nothing else in the world of Nature. As we have already noted, different kinds of birds are clearly at different stages of musical development. The *Field Sparrow*, for instance, has a voice that is much more flexible than that of his cousin, the white-throat, and he has several songs at his command; but he has not yet learned to make big skips with his voice, and his range of tones is very narrow. No two field sparrows sing exactly alike, and each bird composes his own little tune, but all of them sing with such sweetness and expression that their songs have great charm, even if they are simple. Sometimes the song is:

The beginning of each song is sung very quietly with slow, distinct notes, and gradually the singing becomes faster and louder.* The range of the field sparrow's song is seldom more than three notes, but sometimes he uses four.

Of all the members of the sparrow family, the *Song Sparrow* is the most beloved. He is not only one of our best singers, but he is also a willing one, tuneful at any time of day, and sometimes even in the night. He seems to have an excellent idea of melody, and his voice is so well under control that he is able to carry out his musical ideas. No one song that he sings can be called *the* song of the song sparrow. Each bird invents his own songs, and sings so many of them it would take a book to hold all the different ones that careful students have already noted down. Sometimes a single sparrow perching himself for a little practice "to limber up his voice," will sing as many as six or eight different songs before he flies away.

The song sparrow delights in making big leaps, trills and turns in his tune, and is especially fond of octaves. He can make them true, too. One day in spring a song sparrow high on the topmost branch of a pear tree in my garden, caroled out:


Song Sparrow



When he saw me and heard me trying to imitate him, he hopped around to shift his position and make a game of it. Then he offered me one a little harder:

888 | 8 1 | 333 333 | 2 - | -

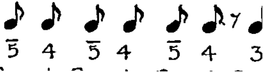
It was as if he said "Now learn that, and I'll give you something still harder!" And sure enough, he did. He soon developed it to:

888 | 85 1 | 333 333 353 | 2 - | -

and then flew away, as if to say, "That's enough for one lesson."

And the song sparrow uses such funny words when he sings! Mr. F. Schuyler Mathews, who has made delightful studies of bird music, has noted the two little tunes given below with their amusing words, which just fit the sounds the sparrow makes.

When you listen to a song sparrow, or to any other song bird, it is easy to write down the tune in numbers if you will first find the "home note," or number 1 of the scale in which he is singing. Bird songs often end



on a note that makes them sound unfinished to our ears. This is because most of our songs end on number 1, or on 3 or 5, and we think they sound more finished when they end on number 1. But a bird gives no thought to where his song is ending, and he may stop on any note. So his "finishing note" is no guide to his scale! *But if you listen carefully, you can learn, by* practice, to tell what scale intervals he is singing, and locate number 1 for yourself.

In learning to play bird songs it is best to practice them slowly until you are sure you are playing the notes and rhythms correctly; then gradually learn to play them as fast as the birds sing them.

Among the birds who go South for the winter, the *Bluebird* is one of the very first to come back to us. He arrives when the days are still cold, perhaps while there is yet snow upon the ground. His beautiful blue coat is always a delightful surprise to the eye; and perhaps because he comes at the time of budding spring when the world seems so full of promise, he has been called the "bird of happiness." The bluebird's song is a sweet, short warble like the one given below.

If you play it over and over on your glasses, you will find it a fascinating little melody.

Bluebirds make us think of robins, for they so often come at about the same time in the spring. No bird of our continent is better known than the *American*

434 - - 543 - - 434 - - 543

Robin, with his red breast, sprightly ways and cheerful song. Much of his time is spent hopping about on the ground searching the lawn and meadow for grubs and worms. He is not afraid to build his nest in a tree near the house, and while Mother Robin keeps the eggs warm, Father Robin makes the air vibrant with his cheery song. The tune varies with each singer, but the notes are generally sung in groups of two or three, the rhythms being some combination of

♩ ♩ and ♫ ♩

Here is one robin tune that was written down by Mr. Mathews in his book on bird music:

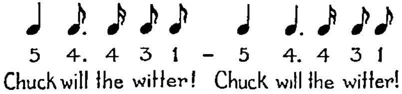
| 32 3 – | 42 3 – | 53 1 – | 2 3 – | 21 3 – |
| 21 2 – | 31 2 – | 55 1 – | 3 2 – | 21 3 – |

Sometimes the robin interrupts his song with

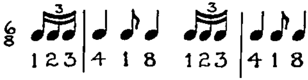
4 4 4 4 4 3 3 3
tut tut tut tut tut tut tut tut

in a scolding voice; then he sings away at his tune again. The little robin song given below will sound well on your glasses:

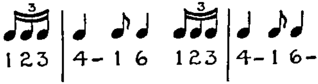
Have you been in the country on a summer evening when the *Whippoorwill* was singing? If you were in the northern part of the United States, you probably heard him say "Whip-poor-will!" But if you were in the south, he must have said "Chuck-will-the-witter!" Both the northern whippoorwill and the southern chuck-wills-witter sing their songs over and over, seeming never to tire of the sounds they make. It is said that the same bird will sing more than a thousand calls without stopping, and many a country lad has fallen asleep and slept by the hour to the singing of "chuck-will-the-witter."



The whippoorwill vaties his song. Sometimes it is



or perhaps



and sometimes

4/4 | 3 (13) 5 – | 1 (61) 3 – | 6/8 | 5 – 3 8 – – | 5 – 3 8 – – |

6/8 | 3 – $\bar{5}$ 1 – – | 3 – $\bar{5}$ 1 – (12) | 3 – 15 – (12) | 3 – 15 – – |

The whippoorwill is seldom seen. When we do catch a glimpse of him, it is when he is darting by late in the evening hunting for moths and insects that fly about at night. During the day he does no singing, but stays quietly on the ground where his dull coloring is not noticed among the leaves and grass.

Very different are the habits of the merry *Bobolink*. He flits about in the bright May sunshine as if on purpose to call attention to himself. When he arrives from the South, dressed in his showy coat of black and white with a yellow patch on the shoulder, his song is at its best, and a very good singer he is. Usually he begins by telling his name with a clear, tinkling call:

1 1 | 5 1 5 1 5 1 |
Bob Bob Link-o-Link-o-Link-o!

then faster,

1 2 5 1 2 5 1 2 5
Bob-o-link! Bob-o-link! Bob-o-link!

and faster still he rolls his syllables together, into a rapid "link-o-wink-o-spink-o-jink" with his tune running higher and higher, and with so many trills and flourishes that it is almost impossible to write it down! Perhaps in all bird music there is no more joyous or enthusiastic singing than the bobolink's spring song. Later in the summer his coat becomes more somber, like the dress of his quiet little wife. Then his singing

changes, too, and only his tinkling call is heard until he leaves us, early in the fall, to feast for a time in the rice fields of the South, and then make his winter journey to far away lands below the equator.

Here is a call which the bobolink sometimes gives:

$$\overset{\frown}{5-1} \quad \overset{\frown}{5-1} \quad \overset{\frown}{5-1}$$

then faster

$$34\dot{7} \quad 34\dot{7} \quad 34\dot{7}$$

The dot over the 7 is called a *staccato* mark, which means that the note is shut off quickly as soon as it is made, without holding it. Can you say the word "Bobolink" in two ways, once with the last syllable staccato, and again without the staccato? The staccato mark is written sometimes above, sometimes below the note.

A great many birds belong to the *Warbler* family, which means the *singing* family, but in spite of the name, there are no very accomplished singers among them. Indeed it is puzzling to know why they have been called warblers. They are small birds, very industrious, and always scrambling over the trees, looking for insects on the bark or under the leaves.

You may have seen the *Yellow Warbler* and thought him a wild canary because of his color. The canary, however, belongs to a different bird family, and is never found wild in North America. To many people the yellow warbler is known as the "Summer Yellow-

Bobolink

bird" and he is a great favorite with those who know him. He sings several songs, but they are all very simple. Here is one of them:

5555 33 31

The *Chestnut-sided Warbler* is a handsome fellow with a song very much like that of his yellow cousin. He is said to sing the words, "I wish, I wish, I wish to see Miss Beecher!" See if you can fit the words to the tune:

46-46-46-46-462

Another warbler, the *Maryland Yellow-throat* sings a number of three-note tunes with words which sound like "Which way, sir?" or "Which is it, which is it, which is it?" Here is one of his tunes:

875 - 875 - 875

The *Nashville Warbler* has a simple but delightful song. His words and melody may vary, but his rhythm seems to be always about the same:

Sometimes his song is like the one below:

The *Meadow Lark* is a yellow-breasted bird a little larger than the robin, who lives in the fields, meadows and pastures, and is sometimes called the *Field Lark*. He must not be confused with the English skylark, one of the world's most famous singers. Meadow lark is not a musician of the first rank, and when he sings his voice is thin, though clear. His song is usually short, and he has a variety of different tunes.
Here is one of them:

35 1 53 8

and another

321 52 321

A meadow lark that sang in the grass about my house one summer seemed to say distinctly:

2.3 1 3 5 3
Laziness will kill you!

Orioles are famous for their brilliant plumage and for the wonderful hanging nests they build for their babies. The best known member of the family is the *Baltimore Oriole*, sometimes called the "Fire Bird" because of his dress of black and bright orange. The quiet looking female does most of the nest building, and she loves to weave into her delicate little basket any bits of brightly colored string which she may find lying about.

Meadow Lark

The male sings a clear little tune, very true and distinct in pitch, and he often uses many staccato notes. Here is one of his songs:

$$1\ 1\ \dot{3}\ \dot{2}\quad 1\ 3 5 - 1\ 1\ \dot{3}\ \dot{2}\quad 1\ 3 5 -$$

and another

$$-2\ 2\ 2 \mid \dot{5}\ \dot{1} - \dot{1} \mid 2\ 3\ 2\ \ 1 - -$$

The *Orchard Oriole* is less brilliant in color than his cousin. He sings in both major and minor keys. Here is one of his major tunes:

$$1 5\ \dot{3} - 4 \dot{2}\ \dot{7} - 4 5\ \dot{3} - 3 3 3\ \ 1$$

and here is a minor one:

$$234\ \ 234\ \ 234\ 3 - 234\ \ 234\ \ 323$$

The *Wood Pewee* is a plain little bird whose song is short and full of feeling. It begins with a slow peaceful "Pee-a-wee!" and ends with a "Peer!" that is drawn out and slides down to the very lowest note of the little singer's voice. Perhaps he sings a slow

6 3 5
Pee – u – wee

in languid fashion, then stops to think a while, begins again with 6 and slides down to 1 on the word "Peer!"

This sliding from one tone to another is called "slurring," and the curved line which is the sign for this sliding is called a *slur*. Can you slur your voice from 6 down to 1 on the word "peer" as the pewee does, without letting your voice stop on any of the notes between?

The pewee sings his song with various slight changes. Sometimes he sings:

634 – 6 1   634 – 6 1

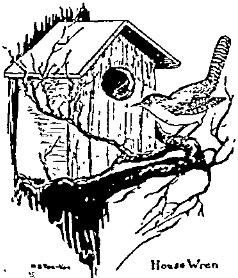
and again

$2.\bar{6}1 - 2.\bar{6}1 - 2.\bar{6}1 - 1\ \bar{6}$

It does not take the listener long to catch the charm of his plaintive little melodies.

The *House Wren* is a tiny brown bird, almost cinnamon in color. You can usually tell him by his short, upturned tail. He likes to build in the hole of an apple tree or in some nook or cranny about an old house; but he is quite willing to nest in the little bird-boxes which people put up for him, and in return for a home he will make war on the insects in the garden, and delight all listeners with his lovely warbles. His song has been compared to rippling water or a musical waterfall. One must hear it to know what it is really like. By whistling the notes below very rapidly, you may gain an idea of it:

646464 323232 - 5353 - 212121



House Wren

The *Catbird* has a coat of dark gray or slate color, and gets his name from the cat-like "meou" which is one of his favorite calls. He loves to perch on a bush or on a tree-top and sing by the hour. Usually he makes up his song as he goes along. When a musician does this, we say he *improvises.* Like many people who improvise, the catbird borrows much of his music from others, and if we listen very carefully to his song, we are likely to hear snatches of the tunes sung by many of our finest bird singers.

Thus much of his singing may be called a *medley,* a mixture of melodies from different sources. Like a true musician, however, he does something more than imitate, he gives us his own ideas about the music that interests him.

Like the Catbird, the famous *Mockingbird* makes use of the songs and calls of his neighbors for his own musical purposes. He is a most accomplished musician and invents many beautiful melodies of his own, being at the same time keenly interested in all the sounds he hears about him. He is such a vocalist that he often outsings the birds he imitates in their own compositions. In his Southern home many people think him the finest singer in America.

It is the *Hermit Thrush,* however, who must be acknowledged as our master bird musician. He is often compared with the Nightingale, and his song is unsurpassed even by that famous European singer. He

wears a brown coat and his creamy vest is flecked with the black spots thrushes wear. His marvelous voice has a range of two octaves or more. Find the two highest octaves of the piano, and play this song of the hermit thrush:

6/8 | 1 35 31 686 5 - | 3 .5 78 75 33 - |
| 5 72 75 53 27 53 | 27 8 356 53 88 - |

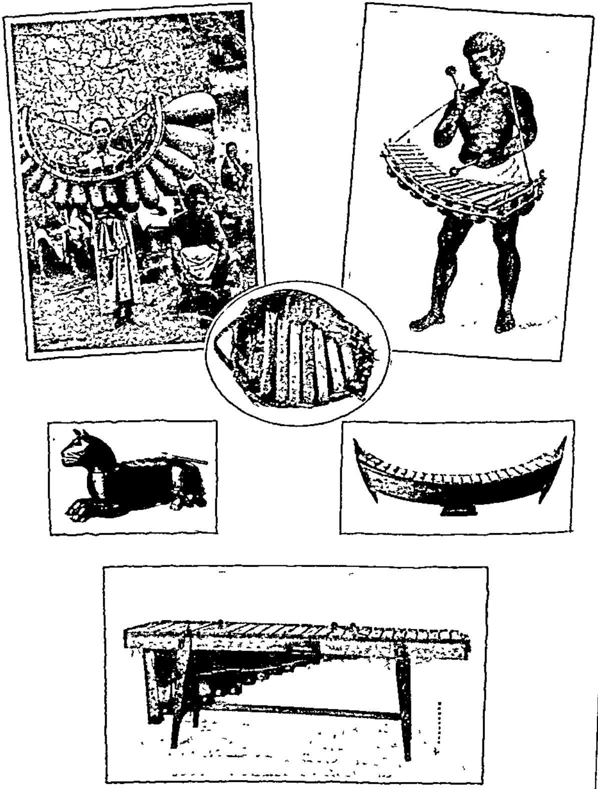
And this one also:

5 - 82 75 3 543 543 - -

How many of the bird songs given in this chapter can you whistle? How many of the birds mentioned do you know when you see them? How many birds can you recognize by the songs they sing?

The picture on page 114 shows ten familiar singers and their songs among the spring blossoms of an old apple tree. Can you play or whistle all of these bird tunes? Can you name the singer from his song? From his picture?

Perhaps you have made a collection of the different bird songs you have heard. If so, you probably have many that are not in this book and could make a charming little book of your own by drawing pictures of all the birds you see, and writing down all the songs you hear them sing.



Marimbas made in Foreign Lands

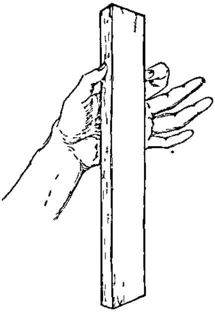
CHAPTER IX

Marimba Making

If you have followed the work outlined in the preceding chapters, you have already had interesting musical experiences of several kinds, and by this time you may wish to make an instrument which will not get out of tune quickly, as do the water glasses, and can be carried about more easily.

One of the most satisfactory of home-made instruments is the *Marimba* or *Xylophone*, made from strips of wood that have been tuned to the notes of the scale. Perhaps you have heard a xylophone played in an orchestra, and are familiar with the sound of tuned wood struck with little hammers.

Have you ever noticed the ringing sound made by a small piece of wood when it is dropped on the floor? The various kinds of sounds produced by simple, natural means, have given rise to many interesting studies and experiments. Even primitive people have discovered that pieces of wood make musical sounds, and in various parts of the world very crude instruments of wood made by savage tribes are to be found, as well as very fine ones made by civilized people. On the opposite page you will find a few pictures of marimbas that were made by primitive people in far-away countries.



In constructing a marimba the most important thing to know is how to make the different tones. You will remember that glasses are tuned to the various scale notes by putting different amounts of water in them. Perhaps the following experiments will help you to find out how strips of wood may be tuned.

Experiment I: Find a flat piece of wood and hold it in the fingers as is shown in Figure 1, and tap it near the center with a pencil or with another stick. Can you tell the pitch of the tone that you hear? Can you find the tone at the piano?

Experiment II: Find another piece of wood and hold the two pieces in the fingers of one hand as shown in Figure 2, and compare their tones. Which one has the higher tone?

Saw off the end of the longer piece, making it two or three inches shorter. Tap it again. What has happened to the tone? Is there the same difference now between the tones of the two pieces of wood?

You will see by this experiment that the length of a stick has something to do with the pitch of its tone. What happens to the pitch when you make the stick shorter? If you are not sure, get another stick, match its tone at the piano and saw it off an inch or two, then match the tone again at the piano, and see what has happened to the pitch.

Experiment III: There is something else that affects the pitch of a piece of wood. Test the pitch of one of your pieces of wood at the piano, and remember which

note it sounds most like. Put the piece of wood in a vise, broad side up, and plane it, taking off about an eighth of an inch of its thickness. Now try its tone again and see what has happened to the pitch.

From these experiments it will be evident that the pitch of the tone from a strip of wood depends upon the length and also upon the thickness of the strip, and that by changing either the length or the thickness, the pitch can be changed.

Practice planing until you can plane as much or as little as the need may be; learn also to saw straight, and to take off thin slices, or perhaps only sawdust from the end of a stick.

Now that you have the main idea in marimba-making, you can see that it is important to have a good tapper for striking the wooden sticks or "keys," one that will bring the best tone from the wood. For this reason it would be well to make the tapper first.

Figures 3, 4 and 5 show a few home-made tappers that are very good. They are made of soft pine, whittled smooth. Two of them have felt cloth around the end, to keep the tones from being harsh when the wood is struck.

If you wish to make a block tapper, as shown in Figure 3, first saw out a block of soft pine wood, an inch or less wide, and trim smooth the corners and edges. The tapper must have a handle, and this may be any kind of a thin or round stick that is strong enough to be durable. Bore a hole in the side of the

6

7

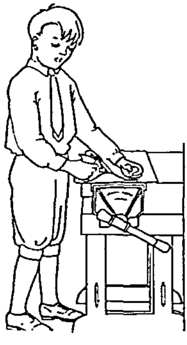
block and fit the end of the stick into the hole. A few drops of glue in the hole will make the stick stay more firmly in place. Let the glue become thoroughly dry and hard before the tapper is used.

A spool makes a good tapper. The two rims of the spool must first be whittled down even with the middle part. A round stick may then be fitted into the hole, and glued in place. Sew a piece of cloth around the spool to keep the tone from being hard when it strikes the wood.

A tapper like Figure 5 may be made of a large wooden bead or any kind of round wooden ball. The heel-end of a shoe-tree makes a good tapper when covered. (See Fig. 2 page 76.)

The Material needed for a Marimba: It is better to buy the wood in long strips ready to saw into the lengths you need. A lumber dealer can supply "stock strips" as he calls them, already cut in the right width and thickness. They should be about 1¼ inches wide and from ½ to ⅝ of an inch thick when you get them from the dealer. Stock of this kind is sold by the foot and if you buy from fifteen to twenty feet of it, you will have enough to make a small trial marimba, for practice in marimba-making, and a larger one on which you can play most of the songs in this book.

As to the kind of wood, there are several kinds that make very good marimbas. California redwood is soft, easy to work with, and very resonant. Poplar, whitewood and basswood are also good, and pine has sometimes been used with good results.



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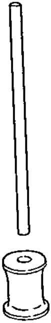
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7

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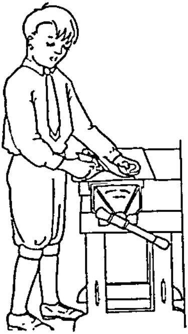


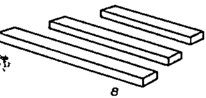
Besides the wood you will need a piece of slender rope, either hemp or cotton. Seven or eight feet will be enough for the two instruments. A piece of soft, loosely twisted clothesline rope will do.

For tools you will need a hammer, saw and plane. A work bench with a vise in it would be a great convenience, too. If you have none at home, perhaps you can use one at school. It is to be hoped that you have a piano, organ or some kind of musical instrument that is in perfect tune and may be used as a pattern for tuning the sticks. In case you have no instrument at home, perhaps you can test the tone of your sticks at a neighbor's piano.

If you have your tools and a long strip of wood cut to the proper width and thickness, you are ready to begin work on a small three-note marimba, one that will give you a little experience in tuning wood before you undertake a larger one.

(1) As a starter, saw off a piece of wood nine inches long. Hold it in your fingers (see Fig. 1) and tap it with the tapper you have made. Strike the stick in the center on the broad side. Can you make it give out a clear, musical tone? Can you match the tone at the piano? It is impossible to say beforehand what the tone of a piece of wood nine inches long will be, for different kinds of wood are different in tone, even when their length and thickness are the same. If you have no instrument to use in matching tones, you may just call the tone of this stick the first tone of your scale, and make the other sticks to correspond to it.

(2) If, however, you are tuning the sticks to match keys of the piano, find the piano note which most nearly matches the tone of this first stick. You may find a key whose tone is an exact match, or perhaps the tone of the stick may fall between the tones of two adjoining keys. Make the tone of the stick match a piano note *exactly*. If you wish to make it match the key which sounds higher, you must make your stick a little shorter to raise its tone. If you wish to make it match the key that sounds lower, you will have to plane the wood to lower its tone.



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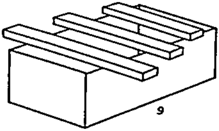
What would you do if, when raising the tone of your stick, you should cut off too much, and find that the tone is too high? What would you do if, when lowering the tone of your stick you should happen to plane off too much and get the tone too low?

As soon as your first stick has the tone you wish it to have, mark it Number 1.

(3) Cut another stick eight and one-half inches long. Try its tone and see if its sound happens to be right for number two of the scale. You will remember from your reading of Chapter VI that Number 2 of your scale is a whole-step above your Number 1. If your new stick does not sound right, you will know how to make it right. If it is too low, what will you do? If it is too high, what will you do? When you have it tuned, mark it Number 2.

(4) Cut another stick a bit over eight inches long. Tune it to Number 3 of the scale and mark it.

(5) Now that your three sticks are in tune you can



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play "Hot Cross Buns," if only you can get them supported in some way so they will vibrate freely. Another experiment will help you to do that.

> *Experiment IV:* (a) Lay the sticks on the table and tap them. (Fig. 8.) Are their tones as clear as when you held them in your fingers?
>
> (b) Lay the sticks across an open shoe box or other cardboard box and tap them. (Fig. 9.) Are the tones any clearer than when they rested on the table?
>
> (c) Lay your piece of rope on the table so that one end of it makes a letter "U" as in Figure 10. Now lay the sticks across the rope as shown in Figure 11, and tap them. Are the tones clear?
>
> (d) Move the rope so that the "U" becomes much wider, and then again much narrower, and experiment until you find the position of the rope that makes the best cushion for the sticks—the position that will allow the sticks to give their clearest tones.

In order to sound its best, any stick must be free to tremble when the tapper strikes it. It is this trembling or "vibrating" that makes the musical tone. The same thing is true of a bell. If you tap a bell while it rests on the table, its tone will not be musical, for the table stops the vibrations, but if you hold the bell by the handle and tap it, the sound is clear and ringing.

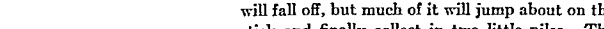
It so happens that a stick vibrates in parts. The trembling is not the same all the way along the stick.

The waves of vibration seem to cross in two places, somewhat as shown in Figure 12, and this leaves two places in the stick where there is almost no trembling. There is an interesting experiment which one may try in order to find out where are the two quiet places in a vibrating stick.

> *Experiment V:* For this experiment you will need one of your musical sticks, a tapper, an empty cardboard box and some sawdust. Place the stick across the box as shown in Figure 13, sprinkle sawdust all over the stick and tap it in the center. Tap it rapidly, but be sure that it does not fall off the box. Some of the sawdust will fall off, but much of it will jump about on the stick and finally collect in two little piles. The center of each pile of sawdust marks a place where the wood trembles least of all. This place is called the *nodal point.*

If you will place your rope so that the stick rests upon it in such a way as to touch the rope only at its two nodal points, the wood will be free to vibrate, and its tone will be as clear as when you held the stick in your hand.

If you measure the distance from the nodal points to the ends of the stick you will find it to be a little less than one-fourth of the entire length of the stick. Try another stick of different length and see if its nodal point is also a little less than one-fourth of its



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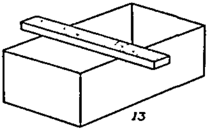

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length from the end. This is a good thing to know, for it enables you to mark the nodal points of your sticks without taking time to use sawdust on each one. (Fig. 14.)

Now to return to the making of our instrument—

(6) Mark the nodal points of the three sticks. (Fig. 14.)

(7) Measure off enough rope to go across the three sticks twice and make a loop at the end beyond the shortest stick.

(8) Now fasten the rope to your three sticks so they will stay in place. Since there is practically no vibration at the nodal points of the stick, its tone will not be affected by driving a little brad or tack through the rope at the nodal points. Use very small brads, one-half inch long, or small tacks. (Fig. 15.)

Lift your instrument by the loop. Your highest tone will be uppermost. Tap the sticks in the center and play a three-note tune. Try it also as it rests upon the table, rope-side down. (Fig. 16.)

Having made a three-note marimba, you will know how to proceed with the making of a larger one. A marimba of eleven or twelve notes is a very useful and convenient size. It should have one octave—eight notes—with three notes below and one or more notes above the main octave.

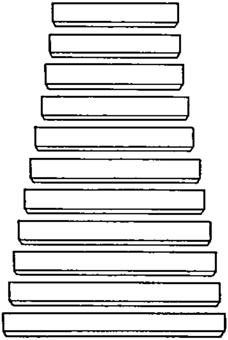
Let us suppose you wish to make your marimba in the key of G, to match your set of glasses, so they can be played together. It would be well to start with Number 1 and complete your main octave first, for in

this way you will probably have less difficulty with the tuning. From your experience with the three-note marimba you will be able to estimate how long the first stick should be. Cut it a little longer than you think necessary, just to be sure that it is long enough. If it turns out to be a little sharp or flat, you will know how to make the tone accurate. If it should happen to be just right for some other note of the scale, put it aside and cut another for your Number 1. If all the sticks are of the same thickness, so that the differences in length as they go up the scale will be from about one-half to one-fourth of an inch, your row of sticks will look very much like Figure 17.

If you do much planing and change the thickness of your pieces, the lengths will probably be very irregular. A low note may even be shorter than a higher one at times, if it is thinner than the high one. So if you wish your marimba sticks to be evenly graduated, it is well to keep them all the same thickness and do as little planing as possible.

Since you are familiar with the notes of the scale by number and by letter (pages 96, 98), you will be able to tune your marimba to sound right for these numbers of the G scale:

$$\bar{5}\ \ \bar{6}\ \ \bar{7}\ \ 1\ \ 2\ \ 3\ \ 4\ \ 5\ \ 6\ \ 7\ \ \overset{1}{8}\ \ \underline{2}$$



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You can of course add more notes if you wish them. Be sure that all sticks are properly marked so they will not get mixed.

When all the sticks are in tune, lay them in a row under side up—for you will wish the rope fastened to the under side—and arrange them symmetrically from the longest to the shortest. If the nodal points have been marked, you will see at once where the rope is to go. Leave a loop above the shortest stick.

You will now see another reason for having the lengths of the sticks evenly graduated, for that is the only way you can arrange to have the nodal points fall in two straight lines. It would be difficult to fasten your rope in two crooked rows. Indeed it will probably be better to make your rope lie straight, even if a few of the nodal points do fall outside the line. If the rope is in the right place on the shortest and on the longest of the sticks, it will probably fall right for most of the others also.

Short brads are better than flat-headed tacks, unless your rope is very loosely twined, for the brads become covered by the rope and do not scratch when the instrument is placed flat on the table.

A marimba with a rope handle may be played in several positions: A small one of only three or four notes may be held up in one hand and played with the

other hand. A large instrument may be hung on the wall and played (Fig. 18), or it may be laid flat on the table, on the floor, or on the lap.

The rope serves two purposes. It keeps the sticks together, holding them in place, and it also serves as a cushion and protector, so that the sticks are free to vibrate in the places where they need to be free in order to produce a musical tone.

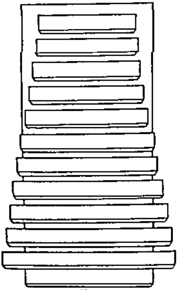
A marimba with a wooden base to support the sticks is more difficult to make than one in which the sticks are held together by a rope. But if it is well made, such an instrument often has a better tone. If you wish a wooden base for your marimba it may be made in this way:

(1) Place the sticks in a row with about one-half inch space between every two adjoining ones.

(2) Cut a wide board—say ten inches wide—to a length which will hold all the sticks as they are now placed, and leave an extra inch of length at each end of the board.

(3) Plane the narrow edges if they are rough, sandpaper the ends, and see that the board is smooth on both sides.

(4) Arrange the sticks on the board as shown in Figure 19. It will be necessary to place something *under them to lift them from the board and allow them* to vibrate freely. Two long narrow strips of wood will



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answer this purpose, if they are narrow enough to touch only a small place on each stick, and if they are placed exactly under the nodal points.

(5) Cut two thin strips of wood about one-half by one-fourth inches and a little longer than the board.

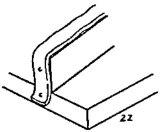
These narrow strips will have to be fastened to the board, and the main problem will be to fasten them in a position to touch the sticks at their nodal points.

Since the strips cannot be curved, they will have to be placed under the nodal points of two sticks, probably the longest and the shortest of the set, letting the other sticks touch where they meet the strip, whether it is exactly at the nodal point or not. Here again we see the need for having the length of the sticks evenly graduated in order to have them sound their best.

(6) Find the nodal points of the longest and of the shortest sticks, and mark the place where those points come on the board.

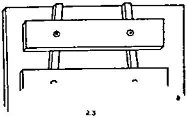
(7) Draw two pencil lines to show where the long strips must be fastened. (See Fig. 20.) The strips must be glued to the board along this line. One slender nail at each end may be used. The strips will be closer together at one end than at the other. (Fig. 21.)

(8) When the glue is dry the strips must be covered with long narrow pieces of thick felt to serve as cushions for the sticks, for if they rest on the bare wooden strips the sound, when they are tapped, will be very harsh



and unpleasant. Lay the felt above the strip, pull it over each end and tack it as shown in Figure 22. Drive no tacks in the top of the strip.

(9) Lay the sticks on the felt-covered strips and try their tones. The next problem is to fasten them in some way so they will stay in place. One good way is to bore two small holes in each stick exactly at the points where it rests on the felt-covered strips, and then to drive slender brads or nails through these holes into the strips. The nails must not touch the wood of the musical sticks. They are merely to keep the sticks from falling off, and each stick must be loose enough to be lifted freely from the board when desired. If the nails hold the sticks tightly in place, the sticks cannot vibrate freely when they are struck. For this reason the holes must be much larger than the nails, and the places for the holes must be measured very accurately, so that each nail will go through the center of the hole and into the thin wooden strip below it. (See Fig. 23.)



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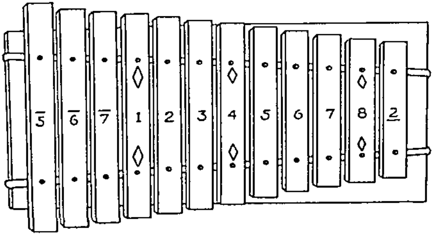
Be sure there are no bits of sawdust on the felt and no nail heads under the sticks, for even a small bit of trash or metal under the stick will deaden the tone.

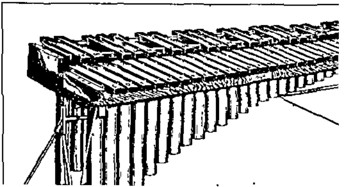
When all of the sticks are placed over the nails, try the tone of each one by tapping it in the middle, half way between the two holes. If the tone of any stick sounds dead or rattling, examine it carefully.

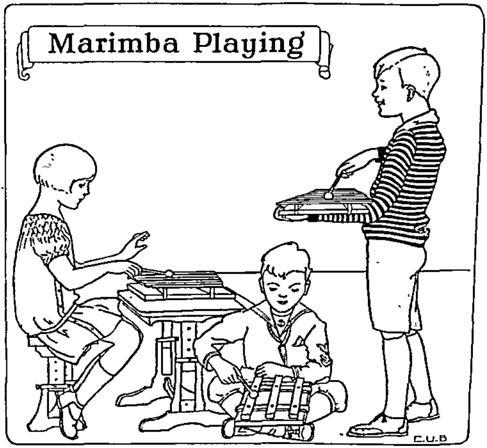


It may be that the nails hold it too firmly. If so, loosen it, or make the holes bigger. If all the sticks are well tuned and arranged on the frames so that they rest loosely on a soft cushion at their nodal points, you probably have a fine marimba. Does it look somewhat like the finished marimba on page 156?

As you will see the sticks of that instrument have been numbered, and special marks have been placed on Numbers 1, 4 and 8 so the player can locate them easily.

At the bottom of this page is the picture of a large orchestral *Xylophone*. If you ever have an opportunity to examine one, you may be interested to find out the various ways in which it differs from the marimbas you have made.




Marimba Playing
C.U.B

CHAPTER X

Marimba Playing

IN trying the tone of your new marimba, let the tapper fall lightly on the stick and bounce up again as soon as it strikes. A marimba's best tones are staccato tones.

Try several ways of using the tapper and see which way seems best. Tap the same stick in three places, (1) in the middle, (2) near the nodal points, (3) at the ends, and find where it must be struck in order to bring out the best tone. Figure 1, on page 161, shows an easy way to hold the tapper.

See whether your marimba sounds best when it rests on the table, on your lap, or held in one hand. The three children in the picture on the opposite page are resting their instruments each in a different way, any one of which gives a good position for playing. No matter where you place your instrument, be sure that the longest sticks are to your left and the short ones to your right, just as the piano keys are arranged with the high notes to the right.

Your playing will be easier if you have some way of marking the sticks so that you can find the different numbers quickly. Many people write the numbers on each stick in plain view. A red mark of some kind on Number 1 and Number 8 and a blue mark on Number 4

The Threshers

$\frac{6}{8}\,|\,5\,4\,3\,3\,2\,1\,|\,\bar{7}\,\bar{6}\,\bar{5}\,1\,-\,-\,|\,2\,3\,4\,3\,2\,1\,|\,5\,-\,-\,-\,-\,-\,|$

$|\,5\,4\,3\,3\,2\,1\,|\,\bar{7}\,\bar{6}\,\bar{5}\,1\,-\,-\,|\,2\,3\,4\,3\,2\,1\,|\,5\,-\,-\,-\,-\,-\,|$

$|\,\bar{5}\,\bar{7}\,2\,4\,2\,\bar{7}\,|\,\bar{5}\,1\,3\,5\,-\,-\,|\,\bar{5}\,\bar{7}\,2\,4\,2\,\bar{7}\,|\,\bar{5}\,1\,3\,5\,-\,-\,|$

$|\,\underset{>}{\bar{5}}\,1\,1\,\underset{>}{3}\,1\,1\,|\,\underset{>}{\bar{5}}\,2\,2\,\underset{>}{4}\,2\,2\,|\,\underset{>}{3}\,1\,1\,\underset{>}{2}\,\bar{7}\,\bar{7}\,|\,1\,-\,-\,-\,-\,-\,|$

will prove helpful and can be put on with paints, crayons, or colored ink. The marimba pictured on page 156 has been marked in this way.

When you have found the best way of using your instrument you will wish to play tunes, and doubtless you will begin with those you already know and can play on the glasses. In this chapter you will find others that are well suited to the marimba.

The old German threshing song on page 160 requires the lowest notes of your marimba but none of the high ones. The arrow-like marks under some of the notes are *accent* signs, and show that these notes are to be stressed, or accented more than the others. In the last two lines, perhaps you can hear the "clip-clap-clap" of the threshing poles beating the grain.

Below is an English folk tune which may be played on the eight notes within the octave. Can you fit the words to this tune and sing it as you play?

Cock-a-doodle-do! My dame has lost her shoe,
My master's lost his fiddling-stick, and doesn't know what to do.
And doesn't know what to do, and doesn't know what to do,
My master's lost his fiddling-stick, and doesn't know what to do.

COCK-A-DOODL

No, John given on the lower margin of this page is an old English melody.

If you play the notes of your marimba from 1 to 8, you will hear the major scale. So far, all the tunes we have had are tunes made on the notes of this scale, and we call them tunes in the *Major Mode.* You probably became familiar with the major scale in your reading of Chapter VI. Now you have come to another kind of scale, and tunes played in another mode.

Minor Tunes.—Play the 8 notes on your marimba from low 6 to 6 and back again to low 6. This scale is called the *Minor Scale.* It sounds strange to one whose ear is not used to it. Try the minor scale on the piano, starting on A, playing only white keys to the next A and back again. This way of playing the minor scale—from A to A on white keys only—is called the "natural," or "pure form" of the scale.

With A as Number 1 and using only white keys, try some of your 8-note tunes on the piano. You may play tunes in the minor mode on your marimba also, by using your low 6 for Number 1. Try "Robin Hood and Little John" in the minor mode. Does it not change the entire feeling of the piece?

On the next page is a short and jolly Irish tune in the minor mode. The numbers of the tune are written according to the way your marimba sticks are num-

No, John

$\frac{4}{4}\ \bar{5}\ |\ 1\ 1\ 2\ 2\ |\ 5\ 54\ 3\ 2\ |$

$|\ \bar{5}\ 1\ 2\ 2\ |\ 5\ 4\ 2\ -\ |\ 5\ 54\ 3\ 1\ |$

$|\ 4\ 21\ \bar{7}\ \bar{5}\ |\ 1\ 3\ \bar{6}\ 1\ |\ \bar{7}\ \bar{5}\ \bar{5}\ -\ |$

$|\ 5\ -\ 4\ 2\ |\ 3\ 1\ \bar{7}\bar{6}\ \bar{5}\ |\ 1\ -\ -\ |$

bered. When you play the tune you will see that your low 6 is really the home-note, and could be called Number 1 of the minor scale.

In the first five notes of the major scale, the half-step comes between 3 and 4. In the first five steps of the minor scale, the half-step comes between 2 and 3. This is the main difference between major and minor scales. There are three forms of minor scales and they differ in the intervals between their upper notes; but all three forms have the same intervals for the first five notes. These are the intervals:

a whole-step between 1 and 2;
a half-step between 2 and 3;
a whole-step between 3 and 4;
a whole-step between 4 and 5.

We will call this short scale a *Five-note Minor* scale. Can you find the 5-note minor scale on the piano starting on C? In the C major 5-note scale, only white keys are used; in the C minor 5-note scale, one black key is needed. Which one is it? Any five-note major scale on the piano can be changed to minor by slipping Number 3 down a half-step, for Number 3 is the only one that is different. The cuckoo that sang the 3 of his song flat (see page 121) was singing a minor interval.

By this time you can probably hear the difference between a major and minor five-note scale. The five-note minor scale can be played on your marimba in

Bohemian Folk Melody

$\frac{4}{4}$ | 3 43 2 32 | 1 $\bar{7}$ $\bar{6}$ – | 3 43 2 32 |

| 1 $\bar{7}$ $\bar{6}$ – | 1 2 3 – | 5 4 3 – |

| 3 43 2 32 | 1 $\bar{7}$ $\bar{6}$ – | 1 2 3 – |

| 5 4 3 – | 3 43 2 32 | 1 $\bar{7}$ $\bar{6}$ – |

The Dance of the Wooden Shoes

$\frac{3}{4}$ 64 | 2 2 64 | 2 2 64 | 2 2 1 | 2 –

64 | 2 2 64 | 2 2 64 | 2 2 1 | 2 –

45 | 6 68 65 | 4 42 12 | 4 45 68 | 8 –

64 | 2 2 64 | 2 2 64 | 2 2 1 | 2 –

The Foggy Dew

$\frac{4}{4}$ 3 | 6 53 6 53 | 2 3 $\bar{5}$ $\bar{6}\bar{7}$ |

| 13 21 $\bar{6}$ $\bar{6}$ | $\bar{6}$ – – 3 |

| 6 53 6 53 | 2 3 $\bar{5}$ $\bar{6}\bar{7}$ |

| 13 21 $\bar{6}$ $\bar{6}$ | $\bar{6}$ – – $\bar{6}\bar{7}$ |

| 1 3 5 43 | 2 2 3 12 |

| 3 87 6 35 | 6 – – 3 |

| 6 53 6 53 | 2 3 $\bar{5}$ $\bar{6}\bar{7}$ |

| 13 21 $\bar{6}$ $\bar{6}$ | $\bar{6}$ – – |

two places, (1) starting on number 6 below, and (2) starting on number 2. It can be played on the white keys of the piano by starting on A, and also on D. Can you find the five-note minor scale starting on other keys? Can you sing it?

As your marimba has no sharps and flats, you can not play minor tunes on it when you use its Number 1 as your minor home note, for in that case you would need a "three-flat." But if you will let your low 6 be the home note, the intervals come out exactly right for the *Natural Minor Scale*, and this scale is called the *Relative Minor* of your major scale, because it uses the same notes, only starting in a different place.

Can you sing the natural minor scale, using the words "six, seven, one, two, three, four, five, six," and make each tone sound exactly right without any help from an instrument?

Play the minor melodies on page 164 on your marimba.

In the tune called *The Dance of the Wooden Shoes* your Number 2 is used as the home note. In the Irish tune called *The Foggy Dew* and in the *Bohemian Folk Melody* Number 6 is the home note.

Can you make a five-note minor tune on your marimba, with low 6 as your home note? One with 2 as your home note? A tune usually sounds better if it ends on the home note, whether it is in the major or the minor mode. Sometimes one can tell whether a piece of music is in the major or the minor mode merely by looking at the last note, and seeing how it ends. If it ends on 1, it is in the major mode; if it ends on 6 it

singing alto, to play it at the same time; for the playing helps to keep the alto voice from following the soprano voice, and gives the alto voice a little support.

Play the tune on the margin of page 167 and its alto on the piano, using C for number 1. Play the tune with the right hand and the alto with the left hand. Now turn it upside down, playing the alto line with the right hand, and the tune with the left hand, placing it an octave lower than it was before. Now the alto has become the tune or soprano, and the new alto is a *sixth* below the tune. A third turned upside down is a sixth, and if you will experiment at the piano, you will find how a sixth may also be changed into a third.

Play sixths up and down the keyboard. Do you like the combination of sounds when you play sixths as well as when you play thirds? Sometimes thirds and sixths are both used in the same tune. Play this and see if you can tell where the sixths are:

5 5	8 8	5 54	3 3
3 3	3 3	3 32	1 1

Try the tune given below in as many keys as you wish. Can you sing the tune while you play the alto part? Can you sing the alto while another person sings soprano?

In two-part music we do not always have two different notes. Sometimes the parts "run together" for a

MARY HAD A LITTLE LAMB

4	3 2 1 2	3 3 3 –	2 2 2 –	3 5 5 –
4	1 5 $\bar{3}$ $\bar{5}$	1 $\bar{5}$ 1 –	$\bar{7}$ $\bar{5}$ $\bar{7}$ –	1 $\bar{5}$ 1 –

3 2 1 2	3 3 3 3	2 2 3 2	1 – – –
1 5 $\bar{3}$ $\bar{5}$	1 $\bar{5}$ 1 $\bar{5}$	$\bar{7}$ $\bar{5}$ 1 $\bar{5}$	$\bar{3}$ – – –

time and then separate again. When two parts have the same note they are said to be *in unison.* Sometimes other intervals besides thirds and sixths sound well together. As you know, any combination of the chord notes, 1, 3, 5 and 8 harmonize. Just what combinations to make will depend on how the melody runs. The alto sometimes moves in opposite direction to the soprano. But whatever it does, the alto must move along smoothly without too many jumps. After you have had a little practice, your ear will tell you which notes sound well together, and you may use the ones you like best. Notice how the two parts "run together" in this little piece:

1 2 3 5	6 5 43 2	1 1 23 2	1 - - -
1 $\bar{7}$ 1 3	4 3 21 $\bar{7}$	1 1 $\bar{7}$1 $\bar{7}$	1 - - -

In the duet below can you locate all the thirds? You will notice a double bar line at the end of this and of other pieces. A double bar is a good way to show that the piece is ended. Sometimes a double bar is used to divide the different parts of a piece, such as the verse and chorus of a song. (See page 171.)

A Duet for Two Marimbas

$\frac{2}{4}$

3 5	46 54	3 5	23 42
1 $\bar{5}$	2 $\bar{5}$	1 $\bar{5}$	$\bar{7}$ $\bar{5}$

3 5	67 86	56 45	34 2
1 3	4 4	3 2	1 $\bar{7}$

3 5	46 54	3 5	23 42
1 $\bar{5}$	2 $\bar{5}$	1 $\bar{5}$	$\bar{7}$ $\bar{5}$

3 5	67 86	58 75	8 -
1 3	4 $\bar{6}$	3 2	3 1

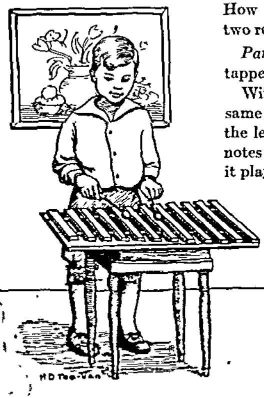
is in the minor mode. Be sure to write down your original tunes, for that is the only way to be sure of preserving them.

Chords: As you know, there are many notes that sound well together, and that is the reason piano players use several fingers at once, to hear the harmony of two or more notes sounded at the same time. Three or more notes that harmonize make a *chord* when they are sounded together.

Numbers 1, 3 and 5 of any major scale make a *Major Chord*, and these three notes always sound well when played together. Find the chord of C major at the piano, strike three keys at once, hold them down and listen carefully to the blending of the three tones. This chord, C E G, is called the *Key-note Chord* in C.

What three notes make the key-note chord of G major? F major? D major? If you can play a five-note scale in any key, of course you can play a chord in any key.

The minor chord, like the major chord is made of number 1, 3 and 5 of the scale. Play the minor chord of C and listen carefully to the blending of the three tones. Play the chord of C major and then the chord of A minor. How many notes are the same in the chords of these two relative keys?



Part Singing and Playing. Find or make a second tapper, and try this experiment on your marimba:

With your right hand play 3, 4 and 5, and at the same time, play 1, 2 and 3 with your left hand. When the left hand plays notes lower than the right hand—notes that sound well with the higher ones—we call it playing *Alto*.

Can you sing 3, 4 and 5, while someone else sings 1, 2 and 3? When people sing different notes at the same time, notes that sound well together, we call it *part singing.* If one sings a tune while another sings alto, it is *two-part* singing. The higher part is usually called *Soprano.* If a deep *Bass* singer, or a *Tenor* singer should join in and sing a part that is still different, it is then *three-part* singing. In *four-part* singing, four different lines of notes are sung at the same time. The rest of this chapter will deal with *two-part* singing and playing.

With your two marimba sticks you can play two notes at once, but you must be sure that you select notes that sound well together. As a rule, *thirds* sound well together. 1 and 3 are thirds, also 2 and 4, 3 and 5, or 4 and 6 played together. Play the white keys of the piano, or organ, in thirds, that is, leaving a white key between every two that you play together. Begin at the top and go all the way down the keyboard. Do you like the sound of thirds? In the little tune at the bottom of this page, each alto note is at an interval of a third below the tune note which goes with it. If there are two people to play, one could play the tune, or soprano, while the other plays the alto. With two sticks, one person could play both parts.

Have you heard people sing in thirds?

Could you sing one line of the melody below while another person sings the other line? Could you play and sing alto, while another person plays and sings soprano? Many people think it is a great help, when

Tune	3 4	5 5	6 5	5 4	3 -	4 -	3 -
Alto	1 2	3 3	4 3	3 2	1 -	2 -	1 -

See if you can make an alto to this tune and play both parts yourself on one marimba.

|3 4|5 5|8 8|7'6|5 –|1 2|3 3|5 3|2 2|1 –|

Make an alto for this one:

|5 6 6 5|5 – 3 –|5 5 65 4|3 – – –

Below is a Bohemian Christmas carol in two parts, soprano and alto. If you have two marimbas tuned together the two parts would sound better on two instruments than on one, because in one part of the song both soprano and alto are in unison.
Can you make a poem in English that will fit this tune, and with suitable words for a Christmas carol? While you are about it, perhaps you could make a Christmas song with both words and tune of your own.

Come All Ye Shepherds

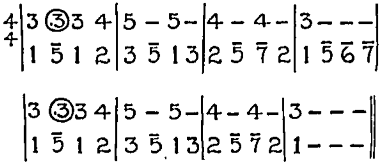
3/4 |5 53 64|5 53 64|5 35 23|1 – –|
|3 31 42|3 31 42|3 1 $\bar{5}$|1 – –|

|5 53 64|5 53 64|5 35 23 1 – –|
|3 31 42|3 31 42|3 1 $\bar{5}$ 1 – –|

|1 31 35|1 31 2$\bar{5}$|1 31 35|
|1 – –|1 – –|1 – –|

|1 31 2$\bar{5}$|5 35 23|1 – –|
|1 – –|$\bar{5}$ $\bar{5}$ $\bar{7}$|1 – –|

In the Bohemian Carol, the soprano part has more notes than the alto. Here is a short two-part piece in which the alto has more notes than the soprano:



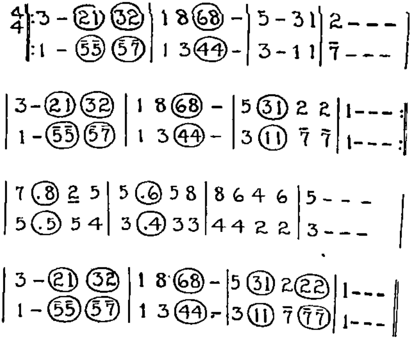
Our next tune is the familiar song *Old Folks at Home*, Can you play the two parts on your marimba?

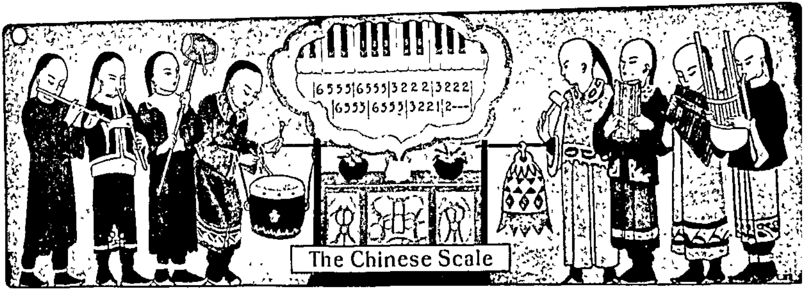
After you have played the alto many times, perhaps you will be able to sing it while someone else sings the soprano.

Notice the group of dots at the beginning and the group at the end of the second line. These mean that the music between them is to be repeated.

In how many keys can you play this at the piano, using the right hand for the tune, and the left hand for the alto?

Old Folks At Home




|6555|6555|3222|3222|
|6555|6555|3221|2---|
The Chinese Scale

CHAPTER XI

The Chinese Scale

FOUR thousand years ago the Chinese were among the most musical people in the world. The Emperors who ruled China during that period did much to develop the use of music in their country, to encourage the best music, and make it helpful in the lives of the people. The Chinese developed some very interesting instruments in those ancient days. They made bells with musical tones, drums, and other instruments, many of which are seldom seen today.

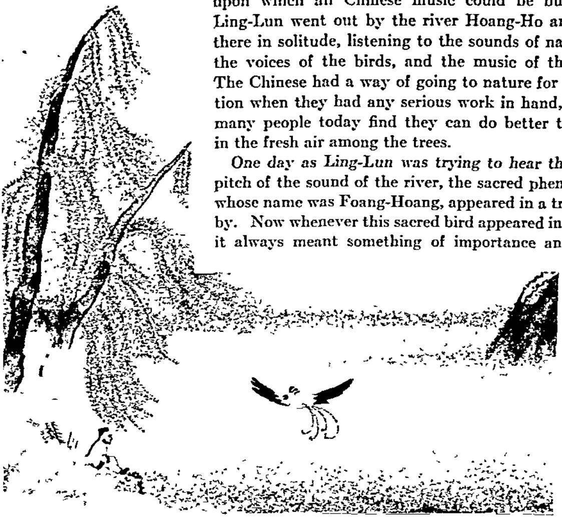
One of the Emperors, Yu the Great, used a few simple instruments in an unusual manner. He wished to make it possible for anyone in the country to be able to get in touch with him when his help was needed, so he placed at the gate of his palace five different instruments to be struck by those who came for help. The Emperor knew what the applicant needed by the instrument which was struck. If the person wished to complain of an injustice, he tapped the large bell. If he wished to consult the Emperor about the manners of the Empire he beat the drum. If he touched the small bell, it meant that he came on private business. If he wished to report a public or private misfortune to the Emperor, he struck the tam-tam. And if the tambourine was shaken the Emperor knew

that someone who was accused of crime was appealing to him to be the judge. So even in those days musical instruments served a practical purpose as well as that of giving pleasure.

It is said that more than four thousand years ago the Chinese had decided on a regular scale and knew how to tune their instruments to this scale and play them in their religious ceremonies.

There is an ancient story which relates that the scale of the Chinese was given to them by a sacred bird called the phenix, which they say was born "in the heart of the sacred fire." This was about 2600 B. C. when Hoang-ti was Emperor of China. The court musician, Ling-Lun, was commanded by the Emperor *Hoang-ti to find the natural laws of music and a scale* upon which all Chinese music could be built. So Ling-Lun went out by the river Hoang-Ho and lived there in solitude, listening to the sounds of nature, to the voices of the birds, and the music of the river. The Chinese had a way of going to nature for inspiration when they had any serious work in hand, just as many people today find they can do better thinking in the fresh air among the trees.

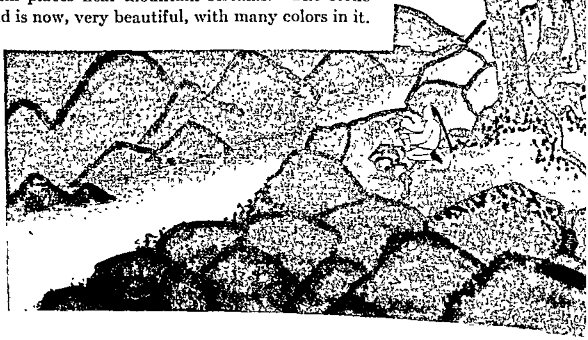
One day as Ling-Lun was trying to hear the exact pitch of the sound of the river, the sacred phenix bird, whose name was Foang-Hoang, appeared in a tree near by. Now whenever this sacred bird appeared in China, it always meant something of importance and good



Ling-Lun and the Phenix Bird

fortune to the Chinese people. Ling-Lun was awed by its presence and listened intently for any sound that might come from its voice. Soon the bird sang out a loud clear tone that seemed to Ling-Lun to be the exact tone which was made by the flowing water of the river. He cut a bamboo pipe until it made a sound of the same pitch so he would not forget the tone, and so he could use it for the first note of the new scale. Then the phenix bird sang again, and there were six different tones in his song. Ling-Lun cut six bamboo pipes to match the tones of the bird. Then a female phenix bird appeared and sang six other tones, which seemed to be tones that came between the notes of the male bird. And Ling-Lun called the six tones of the male bird the masculine notes, and the six tones of the female bird, the feminine notes. He took the twelve pipes back to the Emperor's court and thus fixed the pitch of the Chinese scale forever. Then when it was realized that the tones of the bamboo might change with age, they made metal bells of the same pitch so that the scale might be preserved without change.

Many years later (2357 B. C.) the Emperor Yao discovered that there were certain stones which gave a musical sound when they were struck. The name of the stone was *Yu*. It was very rare, being found only in certain places near mountain streams. The stone was, and is now, very beautiful, with many colors in it.

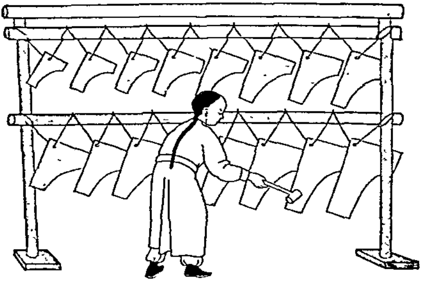
Tuning the Yu Stones

Some kinds of Yu are like marble, others like agate and precious stones. Yao also noticed that the sound of these stones was very pleasing, being clearer than the sound of wood and not so sharp as the sound of metal. He found that by chipping off bits of the stone its pitch could be changed, and this gave him an idea.

He commanded that a great many stones of this kind be gathered together and tuned to the notes of the phenix-given scale, by careful chipping and grinding. These stones were tied by cords and fastened to a strong frame, so that they swung in the air. They were played by being tapped with a mallet or wooden hammer, just as one taps a bell, and Yao called his instrument the *King.* (See Fig. 1.) It is said that when he played upon it the animals gathered around him and trembled for joy. The *king* came to be most highly prized by the Chinese and was used in their temples on the greatest religious occasions. The Emperor often received pieces of Yu stone as tribute from various provinces, and these were used to make musical instruments for the palaces and for the temples.

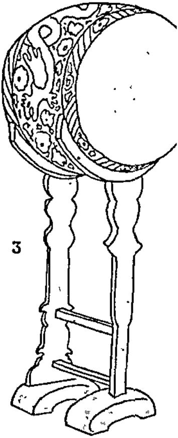
Of all instruments the Chinese claim that the *king* blends best with the human voice. Those who have heard it say that it sounds much like the tones of water glasses, as we play them.

1



All of the ancient Chinese writings praise this instrument. It is said that when the great sage, Confucius, who lived about 500 B. C., heard the *king* played by one of the great Chinese musicians, he was so affected by it that he could take no food for three months. Of course he may have been ill, but the writers lay the blame on the beautiful tones of the *king*.

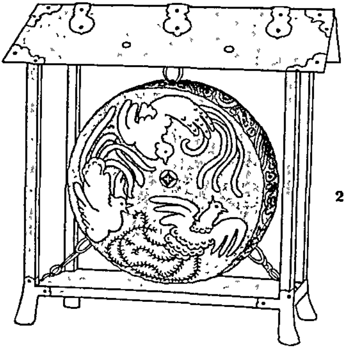
It is also said that Confucius himself was an excellent performer on the musical stones of the *king*. Once while he was playing on this instrument a passer-by, struck with the beauty of his performance, paused to listen, and exclaimed: "Surely one who can play thus must have his soul occupied with great thoughts."



3

In the later days of his wanderings, when he was reduced to the extremity of poverty and starvation, Confucius sang and played as usual, showing no signs of depression or despondency. One of his disciples ventured a reproach, asking how he could sing when they were all famishing. He replied: "The wise man seeks by music to strengthen the weakness of his soul; the thoughtless one uses it to stifle his fears."

Once a sweet-toned *king* was given to one of the Emperors. He did not like the design that was traced on the stones, and he gave orders that a different design should be carved upon each of them. Of course

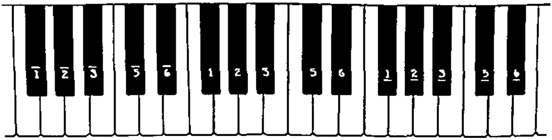


2

when the stone cutters chiseled out even the smallest chip in making the new design, it changed the tone and by the time the new pattern was carved to suit the Emperor, the *king* was hopelessly out of tune. And since the bits of stone could not be replaced, it could never be put in the correct tune again.

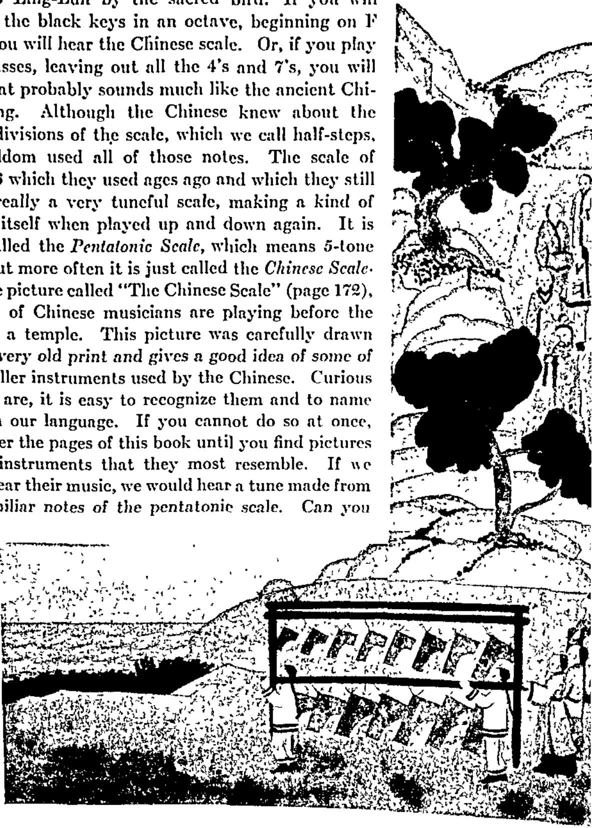
After years of use, many of the *kings* had little bits chipped off and the pitch of the stones became so changed that no one was certain as to what the original phenix-made scale had been. So one day it was commanded that the priests should take the largest *king* from the temple down to the river, and see if its lowest note sounded the same as the rushing water. If it did not, a new stone was to be tuned to the correct pitch and the other stones cut to fit the scale intervals. Sure enough, the pitch was different, and a new stone had to be cut and trimmed and chiseled, until its tone was perfectly in tune with the sound of the river, since that was the tone which the sacred phenix had given to Ling-Lun. This stone was used as the lowest note of a new scale. The other stones were then put in tune, and with great ceremony the newly tuned *king* was taken back to the temple where incense was burned before it. It was pronounced sacred and was allowed to be used only on the greatest occasions.

The scale which the Chinese have used more than any other, is one that sounds much as our Major Scale



would sound if we left out Number 4 and Number 7. The numbers would then be: 1 2 3 5 6 8. These are probably the six tones which the legend tells us were given to Ling-Lun by the sacred bird. If you will play all the black keys in an octave, beginning on F sharp, you will hear the Chinese scale. Or, if you play your glasses, leaving out all the 4's and 7's, you will hear what probably sounds much like the ancient Chinese king. Although the Chinese knew about the twelve divisions of the scale, which we call half-steps, they seldom used all of those notes. The scale of 1 2 3 5 6 which they used ages ago and which they still use, is really a very tuneful scale, making a kind of melody itself when played up and down again. It is often called the *Pentatonic Scale*, which means 5-tone scale; but more often it is just called the *Chinese Scale*.

In the picture called "The Chinese Scale" (page 172), a group of Chinese musicians are playing before the altar of a temple. This picture was carefully drawn from a very old print and gives a good idea of some of the smaller instruments used by the Chinese. Curious as they are, it is easy to recognize them and to name them in our language. If you cannot do so at once, turn over the pages of this book until you find pictures of the instruments that they most resemble. If we could hear their music, we would hear a tune made from the familiar notes of the pentatonic scale. Can you



Taking the King to the River

An Ancient Chinese Hymn

$\frac{4}{4}$ |8-65|3-3-|8-65|6-6-|

|9865|3558|6512|3-3-|

|3553|5-68|5-5-|5865|

|3-3-|2132|1-1-|

|2-12|1-12|3212|3-3-|

|3553|5-68|5-5-|5865|

|3-3-|2132|1-1-|

tell what the gray smoke is that rises from the altar, and why the modern artist has put that little group of piano keys right in the midst of it?

At the bottom of this page you will find a Chinese tune which is one of the oldest melodies known. It was played on the *king* in the religious ceremonies which the Chinese held in honor of their ancestors. Do you like this melody when it is played on glasses or on the marimba?

Can you find bird songs in Chapter VIII that are built on the pentatonic scale?

Can you compose a pentatonic melody on numbers 1, 2, 3, 5 and 6 of your glasses? On the black keys of the piano? On five cereal bowls or mixing bowls?

What is the difference between the pentatonic scale and the five-note scale which was discussed on pages 87 and 88?

On page 180 there is another ancient Chinese hymn, which was played as part of the Confucian ceremonies in the temples.

Try this little melody:

|1 2 3 5|6 5 5 -|1 2 3 5|6 5 5 - |

|3 3 2 -|3 3 2 -|1 2 3 5|6 5 1 - |

The Chinese are not the only people who have used the pentatonic scale. Nearly all the people of Asia have had pentatonic tunes. The people of India, Siam,

CHINESE HYMN

|1 5|3 1|3 5|6 5|6 5|3 2|5 2|6 1|

|8 6|5 3|8 5|6 5|6 5|3 2|6 5|3 1|

O, Susanna

4/4 (12) | 3 5 5 6 | 5 3 1 (.2) | 3 3 2 1 |

| 2 - - (12) | 3 5 5 (.6) | 5 3 1 (.2) |

| 3 3 2 2 | 1 - - Repeat |

Noah's Ark

6/8 5̄ | 1 - 1 3 - 3 | 1 - 1 3 - 3 | 2 - 2 2 3 2 |

| 1 - - ≍ 5̄ | 1 - 1 3 - 3 | 1 - 1 3 - 3 |

| 2 - 2 2 3 2 | 1 - - ≍ 3 | 5 - - 6 - - |

| 5 3 - ≍ 1 | 2 - 2 2 1 2 | 3 5 - ≍ 3 |

| 5 - - 6 - - | 5 3 - ≍ 1 | 2 - 2 2 3 2 | 1 - - ≍ |

Arabia and Turkey, Scotland and England—all of them have liked songs of the pentatonic scale. So many of the songs of Scotland are 5-note tunes that the pentatonic scale is sometimes called the *Scotch Scale.* *Auld Lang Syne* is a pentatonic melody which is very well known:

4/4 5 | 1 .1 1 3 | 2 .1 2 3 | 1 .1 3 5 | 6 – – 6 |

| 5 .3 3 1 | 2 .1 2 3 | 1 .6 6 5 | 1 – – 6 |

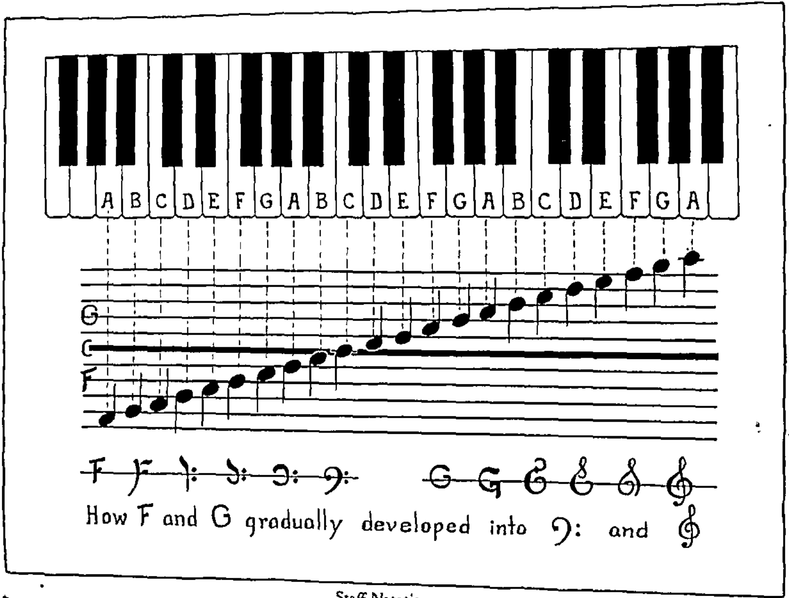
| 5 .3 3 .1 | 2 .1 2 6 | 5 .3 3 5 | 6 – – 6 |

| 5 .3 3 1 | 2 .1 2 3 | 1 .6 6 5 | 1 – – |

Some of our own beautiful folk songs, the negro spirituals, are made on the pentatonic scale, "Swing Low, Sweet Chariot," for instance. The melodies on page 182 and the one given below are built on this scale and may be played on glasses or whatever you can tune properly. If you play them on the piano and use F-sharp as Number 1, remember to use only black keys. Can you play them on white keys, with F or C or G as Number 1?

PENTATONIC MELODY

DVOŘÁK



Staff Notation

CHAPTER XII

Staff Notation

A WAY of reading and writing music by means of numbers was given in the early chapters of this book, in order that you might be able to play tunes on all the simple instruments that have been discussed. Your experiences with these numbers have probably helped you to understand how tunes are made, and how to compose melodies and write them down, even if you have no piano or any other music books. You have also learned the signs of rhythm, so that you can beat rhythms on your drum, and you can show by a line of notes how the rhythm of any tune goes. You can write the rhythm of the little song "Hop, My Pony," for instance, in one line, and in another line show the notes of the tune, thus:

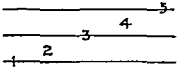
1 3 5 5 4 3 2 1

You can also put these two ideas together by leaving off the line of notes and writing the numbers this way, letting the circles and lines show the rhythm:

1 3 5 - 54 32 1 -

There is another way to put the rhythm and tones of the tune together, and this time we may leave off the numbers. If you have never tried it, it may be hard to think of writing a tune without numbers, but we can make a kind of ladder, and let the different places on the ladder stand for the different numbers, putting the notes that show the rhythm on it in those places.

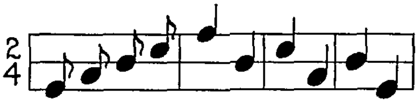
Suppose we draw a ladder of three lines and use each line for a number, and each space between the lines for a number, thus:



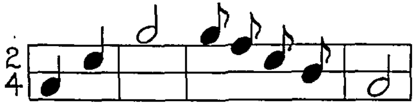
Let us take the same tune, "Hop, My Pony," and see if we can place it on these lines and spaces so we will not need to write down the numbers. The numbers are 1 3 5 5 4 3 2 1, and the rhythm is:

We will make a new set of lines, and write the rhythm notes in the number places as you see them in the margin below. Thus it is not only easy to find the places for the notes, but when written in this way, they also make a pleasing picture.

Now let us place the tune "When I was a Schoolgirl" (see page 89) on the lines and spaces, and this time we will not forget to divide it into measures, and give the sign to show the meter (see page 50).



Does it not begin to look like the music that is found in regular music books? Suppose we say that the space between the two lower lines is to be the place for Number 1, and write "Hop, My Pony" in a new position:



Just as you may start a tune on any key of the piano, so you may have any line or any space for your Number 1. If you should place Number 1 of this song on the second line, you would have to add another line in order to make enough places.

Draw *five* lines, let the second line be the home for Number 1, and write the tune of "Hop, My Pony." Write it again with the home note in the space above the middle line.

A group of straight lines made to hold notes is called a *staff;* and when a tune is written in notes on a staff, we say it is written in *staff notation.* Let us number the lines of our five-line staff, beginning at the bottom; first, second, third, fourth and fifth lines. Number the spaces also, beginning at the bottom; first, second, third and fourth spaces. Can you draw a five-line staff, let the second line be the home for Number 1, and write the tune "Lavender's Blue" (see page 94) in notes on this staff? Here are the numbers:

| 1 5 5 | 5 4 3 2 1 | 1 6 6 | 6 – – |

| 1 5 5 | 5 4 3 2 1 | 4 3 2 | 1 – – |

Write the tune "When I was a School-girl" using the third space for Number 1.

Play this tune on any instrument you wish, remembering that the second line is Number 1:

Play this on any instrument you wish, remembering that number 1 is now in the first space:

Long ago, before people began to write music on lines and spaces, they wrote the words of their songs with little curly-cue figures which showed whether the voice went up or down. These figures were called *neumes*, and there grew to be a very elaborate system of them. Finally some one thought of the plan of drawing a straight line across the page, so that the neumes would look neat and orderly, and after that, the plan of having several lines gradually developed.

The first line that had a definite note-name was the one which stood for the F below the note we now call Middle C—the C nearest the middle of the piano—and the next to be named was Middle C. At first the F line was colored red and the C line yellow, so the eye could see them very quickly, and the music of those days made a very colorful picture on the page. Afterward, as more lines were added, the music writers gradually did away with the color, and made all the lines black. There finally came to be eleven lines in all, and this was called the *great staff.*

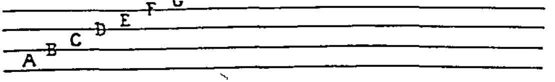
Find Middle C at the piano. Draw a line across the middle of a sheet of paper, and let this line represent Middle C. Draw five lines above it. These lines with all their spaces will give places for all the notes from Middle C up to the G in the second octave above Middle C. Now draw five lines below. These lines with all their spaces will give places for all the notes from Middle C down to F in the second octave below it.

At the bottom of this page you will find a picture of these eleven lines that make the great staff, with the names of the different notes that belong on the lines and in the spaces.

You will notice that this eleven-line staff gives places for three octaves of notes, which is all that most simple music requires.

But eleven long lines across a page are very confusing to the eye. It is difficult to locate the Middle C line, and then count the lines up and down to find the position of other notes. Years ago when musicians had reached this point in learning to write down music, they, too, were confused by so many lines. So they erased the Middle C line and left a wide space with five lines above it and five lines below it, which the eye could see and count very easily. Whenever Middle C was to be written, a short line, just long enough to hold the note, was placed in the open space. On the opposite page you will find a row of notes written on this improved *great staff.*

In those days, as now, the tunes for the men's voices were written on the five lower lines, and the parts for the women's voices were written on the upper lines. If no notes above Middle C were to be sung, only the lower five lines were shown on the paper; and if no notes below Middle C, then only the upper five lines were used.



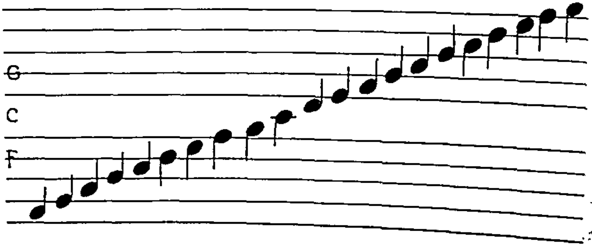
But in case one needed only half of the great staff, how could one tell whether it was the five lines above Middle C or the five lines below it? To solve this difficulty, certain signs called *clef signs* (the word clef meaning *key*) were placed at the beginning of every staff, to show whether it was the upper or lower staff. Every line was known to have a name, as shown in the great staff at the bottom of page 190. The second line above Middle C and the second line below it were taken as the key or clef letters to stand for the two staffs.

The lower staff was marked by placing a letter F on the fourth line. During all the years that followed, the sign went through many changes and finally came to have the shape of Figure 1. Turn to the plate on page 184 and see how the shape of the F gradually changed. It is still called the *F clef*, and the dot which forms the beginning of the F is always placed on the fourth line. (See Fig. 2.) It is also called the *bass clef*—bass meaning low. Whenever you see this sign in music, you may know that the lower half of the great staff is indicated, and that Middle C would be written on an extra line just above the top of this staff.

1

2

When the upper staff was used, a G was placed on the second line, at the beginning of each staff, to mark the place of that note. In time the shape of the G also was gradually changed (see page 184) and today the shape of the sign that locates G and stands for the upper



staff is that of Figure 3. It is called the *G clef*, and the large circle of the figure swings around the second line. (Fig. 4.) It is also called the *treble clef*. Whenever you see this sign in music, you may know that the upper half of the great staff is being used, and that Middle C would be written on an extra line below the bottom line of this staff.

4

Sometimes instead of using either the upper or the lower part of the great staff, five lines from the middle part are used. Since this part of the great staff includes the line for Middle C, it is called the *C clef*, and a sign which developed from C is used for the clef signature. The C clef is not used for piano music, though it is sometimes used in writing music for other instruments.

Here is the writing of the C scale going up one octave from Middle C in the treble clef, and going down one octave from Middle C, written in the Bass clef.

Can you play the two scales together on the piano, the notes of the treble clef with your right hand, and those of the bass clef with your left hand?

Can you play on the piano this little melody that is written on the great staff, or the treble and bass staffs placed together?

Since most of the instruments you have made are tuned to notes that are mainly above Middle C, you will have more need for the treble staff than for the bass staff. Most songs except those for men's voices, are written in the treble clef; and if a note happens to drop below Middle C, it is an easy matter to add a few short lines called *ledger lines* for the placing of the low notes. By the use of ledger lines one can add as many notes as one wishes above or below either staff.

Here is another way in which the tune written above on two staffs may be written on one staff:

Here is another piece written in two ways, first on two staffs, and again on the margin of the page, on one staff. Play it on the piano from each set of notes and see if the playing is not exactly the same.

You see it is sometimes simpler to use one staff, and add extra lines when they are needed.

Can you play the tune on the opposite page on the piano? Play it on your marimba, bearing in mind that Middle C corresponds to the Number 1 of your marimba. Do you play it well enough to recognize it as one of the tunes which was written in numbers in one of the earlier chapters?

French Folk Tune

All Through the Night

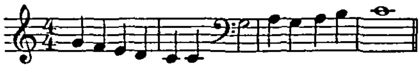
Welsh Tune

Can you write on the staff, some of the other tunes which you have played from numbers, using Middle C *as your Number 1? Perhaps you can also write some* of your own compositions on the staff.

All of the French melody on page 196 is written in the bass clef. Can you play it at the piano, and also on the marimba or glasses, remembering that C is Number 1?

Sometimes it is more convenient to write part of a tune in one clef, and part in another clef, to save the trouble of using many ledger lines.

Notice the change of clef in this line:



The Welsh tune on page 196 is written in two clefs. Notice the reminder which is placed at the end of the measure just before the change is made. Can you read these notes well enough to play the tune on the piano?

The rest sign in the fourth measure is one that you will often find in printed music, instead of the 𝄽 sign that we *generally use in writing music.*

The discussion so far has concerned only the white keys of the piano—the naturals. You will remember from your reading of Chapter VI that the sharps and flats are very important keys, especially when playing in other keys besides the key of C. You have probably

already experimented to find the different black keys that are used in the major scale when starting it on different keys. (See page 96.)

The following table will serve to remind you of how the major scale runs in the different keys:

When C is Number 1, only white keys are used.

When G is Number 1, F♯ is needed.

When D is Number 1, F♯ and C♯ are needed.

When A is Number 1, F♯, C♯ and G♯ are needed.

When E is Number 1, F♯, C♯, G♯ and D♯ are needed.

When B is Number 1, F♯, C♯, G♯, D♯ and A♯ are needed.

When F♯ is Number 1, F♯, C♯, G♯, D♯, A♯ and E♯ *are needed.*

When F is Number 1, B♭ is needed.

When B♭ is Number 1, B♭ and E♭ are needed.

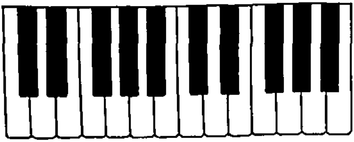
When E♭ is Number 1, B♭, E♭ and A♭ are needed.

When A♭ is Number 1, B♭, E♭, A♭ and D♭ are needed.

When D♭ is Number 1, B♭, E♭, A♭, D♭ and G♭ are needed.

When G♭ is Number 1, B♭, E♭, A♭, D♭, G♭ and C♭ are needed. And these turn out to be the same keys that we find in the scale of F♯.

But when we read music, how are we to know which note is Number 1? From the table above it can be seen



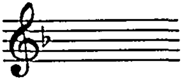
that, if we know the number of sharps or flats in the scale on which a piece is built, we can tell at once which note is Number 1, or the key in which the piece is written. Long ago music writers decided to place sharp and flat signs at the beginning of every piece to tell the number of sharps or flats to be used. Thus, if a piece is *in the key of G major, there will be a sharp sign on the* F line at the beginning of each staff to show that all the F's are to be played F♯. This, of course, is the same as telling you that G is Number 1. If a piece has three sharp signs at the beginning, showing that F, C and G are all to be played sharp throughout the piece, you may know that it is in the key of A. If there are five flats at the beginning, in what key is the piece? If there are three flats, what is the key?

At the bottom of this page you will find all the key signs, or *signatures*, listed in the above table of major scales. Can you name the key that is meant in each one of these major scale signatures?

These signatures are also used for the minor keys. The signature for any major key is also the signature for its relative minor which has number 6 of the major scale for its key note. (See page 165.) Thus one sharp could signify either the key of G Major or of E Minor; no sharps or flats could mean either C Major or A Minor; one flat, either F Major or D Minor.

Below are the same signatures with the keynote chords in both major and relative minor keys.

Play one of your favorite melodies on the piano in the key shown by this signature:



Write "Hop, My Pony" on the staff in these two keys:

On the lower margin of this page and on the two following pages there are a number of short melodies written in several keys, three of them in minor keys. You are already familiar with the meter signs at the beginning of each tune, for they were discussed in Chapter III. Can you play all of these melodies on the piano?

All music consists of phrases or "musical ideas." (See page 78.) Some of the following melodies are made of long, and some of short phrases. Can you tell how many phrases there are in each little tune? Can you write them in numbers, and then play each tune in several keys? In their relative minor keys? Can you write them on the staff in different keys? If you can do all these things, you will be able to make use of the piano keyboard in many interesting ways, and you would probably enjoy reading music from a book of piano pieces.

1 

2 

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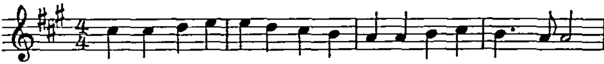
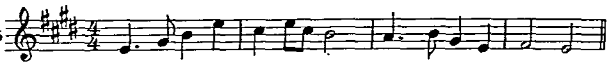
4 

5 

6 

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0


11


12


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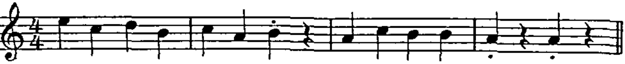

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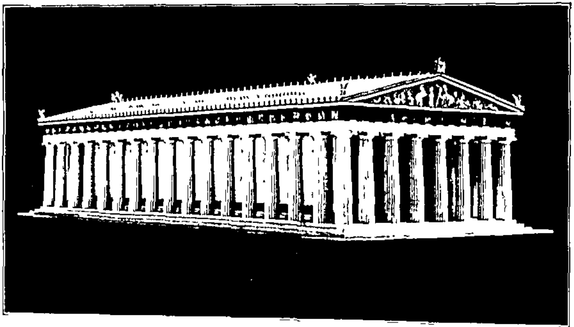


Perfect Form in Architecture

CHAPTER XIII

Form and Composition

AGES ago, when human beings first began to make musical sounds, there was no thought of regular songs or "pieces" of music, such as we hear in these days. Any succession of tones that came as an expression of feeling was all music meant at first. But as people grew more intelligent, they gradually took more and more pleasure in musical sounds that were arranged according to some plan. Any savage could beat a drum at random and make noises on it, even without thinking, just as he could make various sounds at random with his voice; but only those savages who were able to think out a plan for their drum beats, and a plan for the tones of their voices, could hold the attention of others for very long. Thus it came about that music began to be shaped into those arrangements of rhythm and tones which we call *Form.*

The forms of some things can be seen—the form of a picture, a statue or a house, for instance—and other forms can only be heard. All poetry has form in its rhythm, and one of the reasons we like poetry is because of the arrangement of sounds into pleasing shapes or patterns. This is also true of music. The person who plays a long string of notes without arranging

them according to some plan, is really not playing music; he is only making sounds. It is impossible to have a melody without some kind of pattern for the arrangement of the tones. Clap the rhythm of *Hot Cross Buns* (page 70) without singing the words, and this will help you to hear the form of the little song. As shown on the margin of this page, the plan of arrangement is: two lines alike, a different line, and the first one repeated again.

Clap the rhythm of the Mother Goose rhyme, *Little Miss Muffet,* as you say the words, and see if your ears can catch the "sound-shape" or the form of it. The words are:

Little Miss Muffet sat on a tuffet
  Eating some curds and whey;
There came a big spider and sat down beside her
  And frightened Miss Muffet away!

The rhythmic plan of the verse is shown on the margin of the next page.

When you look at a beautiful building, your eye takes in at one glance many of the things that make it beautiful, and you may look as long as you choose on any one part, or on the building as a whole. Not so with music. A note sounds and it is gone forever, and it can never be brought back except in the memory of someone who heard it. But the person who remembers

can follow in his mind the plan by which one group of notes follows another group, and this plan is its *form.* When you hear the second group of "Hot Cross Buns," you remember very distinctly that you heard that exact pattern of notes before, and when the same group is heard again in the fourth line, you still remember it, and it pleases you because it is almost like hearing the voice of an old friend. Only by hearing and remembering can one understand and enjoy the form of music as it passes by. When an artist makes a beautiful painting or statue, it may remain for people to enjoy its form for centuries, but music has to be made over anew every time it is enjoyed. This fleeting quality of music makes its form more difficult to understand; and yet it is true that some of the same things that make a building or a painting beautiful also make music beautiful. There are certain laws of beauty which any art must follow in order to give satisfaction.

Perhaps the study of the picture on page 204 will help to show some of the things that are necessary to any beautiful work of art. It is a picture of the Parthenon, a temple built more than two thousand years ago, at Athens, Greece, and generally considered one of the most beautiful buildings ever constructed. At present, it stands in ruins, but our picture, taken from a model of its restored form, shows how it once looked.

As you will see, the Parthenon is a clear-cut work of architecture with its main interest unified in one spot—the center of the building. No one would ever think of it as being several buildings put together. So, first of all, it has *unity*. The architects have given the impression of unity in several ways; the gable comes up in the center, over the entrance, to mark the center of interest, while around the building are columns, all made alike, and each one a part of a great frame around the center of interest. If these columns were not alike in shape, the unity of the building would be less perfect and less pleasing. The common idea is *repeated* all around the building, which is a good way to give unity. And yet everything about the building is not the same. The straight lines and angles of the gable roof give a pleasing contrast to the round columns, and furnish *variety* of line. You will also notice that the building gives the idea of being well *balanced*. No part of it seems top-heavy or side-heavy, but it rests comfortably on its foundation, with even balance of its sides.

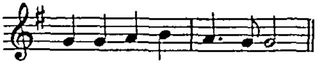
From the above description of the Parthenon, we may select four ideas that are necessary to the form of beautiful buildings and beautiful music: (1) unity around a main idea; (2) repetition of parts to help give unity; (3) changes of various kinds in order to give "variety in unity;" and (4) balance of its parts to give the feeling of comfort and even-sidedness.

Let us examine a short melody by a great composer, Beethoven, and see if we can recognize all of these qualities in some way. We will start with the main idea,

then another group of notes to offer a little contrast,

then for the sake of unity, repeat the main idea,

and, to preserve the balance and unity, another line of equal length, ending on the home note.



Play these four lines on the piano as one piece, and see if you *hear* the unity, the variety and the balance in

its form. Here is the number notation of this melody. As you may see its well balanced form is clear, even to the eye:

$\frac{4}{4}$ | 3 3 4 5 | 5 4 3 2 |

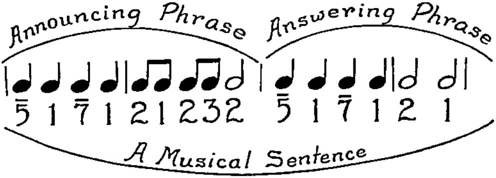
| 1 1 2 3 | 3 ·2 2 – |

| 3 3 4 5 | 5 4 3 2 |

| 1 1 2 3 | 2 ·1 1 – |

In every piece of good music there are repetitions of some kind, and contrasts of some kind. If you turn through the former chapters of this book and examine all the tunes that have been given, you can locate the lines that are repetitions, and the lines that are given for contrast. It is easy to do this by looking at the written tunes. Can you tell, merely by listening to a tune, where the repetitions come and where the contrasts come? If so, you will be able to derive much pleasure from the forms of good music.

A form of melody like that above is often said to consist of (1) an announcing phrase and (2) an answering phrase, which, together, make a *musical sentence;* and this sentence is balanced by another sentence consisting of an announcing and an answering phrase.



You will notice that one of the phrases in the second half of the Beethoven Melody is a repetition of one in the first half.

At the bottom of this page you will find the two sentences written on the staff. The long curved lines over the notes mark the different phrases.

Can you make a melody of two balanced sentences (four phrases)?

"Lavender's Blue" is a good example of two balanced sentences. The tune is given in numbers on page 94. Here is the same melody in notes written on the staff:

Lavender's Blue

If we wish to give a name to this kind of form, we might call it the *Two-sentence Form* or *Two-part Form.* There are many short tunes in this book in the two-sentence form. Can you find them all? Sometimes

Two-part Form (Two Sentences)

music written in two-part form has more than one sentence in each part. "The Threshers" (page 160) is a good example of this.

One of the commonest forms of music is what is called *Three-part Form.* It starts out with a main idea, or Part I, then there follows a contrasting melody for Part II, and Part III is a repetition of Part I. So many folk-songs are made on this plan that it is usually called *Three-part Song-form.* The "Spring Song" on page 91 is a good example of three-part form. The tune is given here in staff notation.

Spring Song

The second line gives variety, the repetition gives unity and leaves the hearer with a feeling of satisfaction. The main difference between two-part form and three-part form is that three-part form always repeats the first part for the ending, while two-part form does not.

Lightly Row (page 90) is also in three-part form with Part I repeated before the contrasting line is given. Many songs written in three-part form are arranged to repeat the melody of the first part before the contrast is given, in order to have four balanced sentences.

Lightly Row

This repetition also helps to make one familiar with the first part so it will be more certainly recognized when it is repeated at the end. "Pierrot" (page 109) and the "Spring Song" (page 112) are good examples of this. Perhaps you can find others. Can you tell where the phrase marks should be placed in "Lightly Row," and in the "Spring Song" on page 212?

"Winter Goodbye" (page 89) is in three-part form, with two lines of the contrasting melody, and a little change in the repeated sentence. Can you locate the change? Would you like the song better if the first sentence were repeated exactly?

Winter Goodbye

Can you write a melody of three sentences in three-part form? Can you write a melody of four sentences in three-part form with Part I used three times? Can you write a melody of four sentences in three-part form with two sentences for contrast before the first part is repeated? Can you write them in staff notation?

The three-part form may be used, not only for short melodies, but for long pieces as well, and each part may be several sentences long. Sometimes each part is also

made up in two-part or three-part form. The Beethoven theme in two-part form given on page 211 is really Part I of a three-part melody. Below you will find the three parts, which you may be able to play on the piano or on your 11-note marimba. It is a melody from his Ninth Symphony, one of the greatest musical compositions ever written.

If you wish to compose a piece of music in three-part form you must first make a good phrase to be used as a central idea, or as a starter for Part I. Then make other phrases somewhat like it until you have a melody that sounds balanced, one that gives you a feeling of complete unity with a little variety in it. This first part we will call the *Statement*, as it is called in the compositions of great composers. Now make another tune entirely different, but keep the meter the same and we will call this second tune the *Contrast*. Then, to preserve the unity of the piece, we must come back to the first tune and play it again. This time it is called the *Restatement*. When you play it all through, it should sound like an interesting, complete unit.

Melody from Beethoven's Ninth Symphony

THREE-PART SONG FORM

(Three Sentences)

Folk Tune

Statement

Contrast Repeated

Restatement

Not only songs, but many dances and other pieces of instrumental music are made of Statement, Contrast and Restatement.

Composers have many ways of giving variety and at the same time preserving the unity of a composition, just as painters and other artists have. One way to give variety is to repeat a phrase with a different force, making it either louder or softer than it was when played the first time. In music the Italian words *forte* and *piano* are used to show when the music is to be loud or soft, and generally the first letter only is used, *f* for loud, and *p* for soft. *Fortissimo* and *pianissimo* are the words that mean very loud and very soft, and the signs usually written are *ff* for very loud and *pp* for very soft. Sometimes a contrast is gained by playing a phrase *legato* (smooth and clinging) and repeating it staccato (bouncing and detached).

Another way to make variety in repetition is to repeat a group of notes a little higher or a little lower than they were first given. When a group of notes is repeated in this way, at a different pitch, it is called a *sequence*. Here is a group of four notes with two sequences following it:

12 | 3 3 23 | 4 4 34 | 5 5 32 | 1 –

The plan of each group is exactly the same, but as each group starts in a different place, it gives a pleasing variety in sound without breaking the pattern of the piece.

Can you find all the sequences in "Lightly Row" on page 90? In the little folk tune on page 95? In "If I were a Bird" on page 110? This last song has a form that is a little different from the others we have examined. The first part is made of three phrases, the second phrase being a sequence to give unity to the line. The next line also has three phrases, the second one a sequence, and the third phrase of the second line is a repetition of the third phrase of the first line, with one extra note thrown in to bring the phrase down to the home-note at the close. This is a two-part form, the second part giving a perfect finish to the first.

Can you make a tune with sequences in it? It is great fun to experiment with sequences, trying a group of notes first one way and then another way, using the same grouping every time, only changing the position. Sometimes a group of notes sounds well if the figure is turned upside down! Try the experiment in a tune of your own composition.

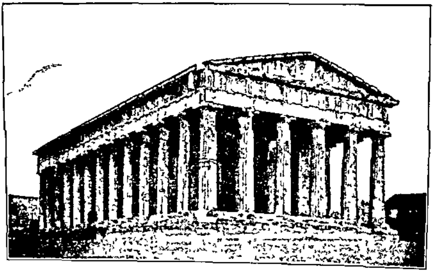
Variety is sometimes given by playing a phrase or sentence in a different key, and often by changing from major to minor mode. Sometimes a composition in three-part song-form has its second melody in the minor mode for contrast—usually the relative minor of the original major key. Can you make a tune in C Major with a contrasting tune in A minor?

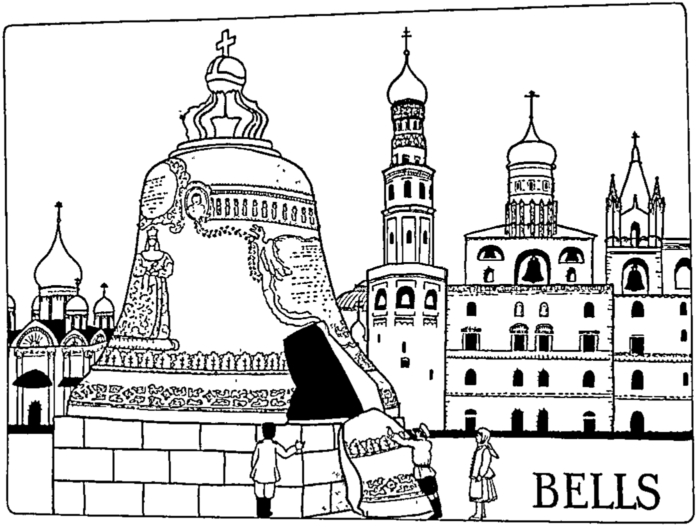
Can you make a tune in G Major with a contrasting tune in D Major? Can you use the two keys of C and F Major in a three-part form melody?

Are you familiar with the ways of writing the correct rhythms of your tunes according to the note values given in Chapter III, and placing all the notes in their proper places on the staff?

Can you give your tunes both variety and unity in rhythm? In melody? In expression?

Can you make phrases into sentences and tell when your sentences are well balanced? Can you make use of repetition and sequences in ways that give variety, and still keep to the pattern you have planned for your composition?




BELLS

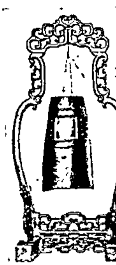
CHAPTER XIV

Bells

It was an important day in the history of music when the Chinese Emperor Hoang-ti, more than forty-five centuries ago, commanded that metal bells should be made to match the tones of the scale sung by the sacred Phenix bird (see page 174). Bells were then given a place of honor among musical instruments though already, so it is said, the bell had the distinction of being the first instrument used in musical performances. In time the bell, the musical stones, and the drum became the most highly prized of all instruments in China. In those ancient days the bell was not only honored in the temple, but came also into practical service outside the temple. It was used as a pattern for tone, and the same bell, being of a certain unchangeable weight, was used as a standard for weight. Since it was hollow and could hold a certain amount of liquid or grain, it was used also as a measure for bulk, just as our bushel and quart measures are used.

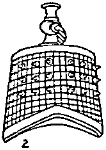
The ancient Chinese tuned bells to their scale and hung them on a frame in much the same manner that the stones of their *king* were arranged. Such a set of tuned bells was called the *Pien-chung.* The tones matched exactly the tones of the stone *king,* and these

two instruments were always found together in the Confucian temples, the bell instrument to give the first signal, and the stone instrument to reply.



1

Metal bells of very interesting shapes were made by the ancient Chinese, but many of them are no longer to be found except as rare specimens in museums. There came a time in China when a new line of emperors rose to power and ordered all the old musical instruments, all the standards that had been set by former rulers, and all the books to be destroyed. Nearly all the ancient instruments were burned at that time, and of those which happened to be saved, very few are still in existence. A few faithful priests buried some of the bells and these were dug up centuries later. Figures 1, 2, 3 and 4 show several of these ancient bells. Some of them had clappers, probably made of wood, but most of them were struck on the outside, just as most of China's bells of modern times are struck. Today one finds in China metal bells ranging in size all the way from a tiny "wind-bell" that hangs in the wind and gives a weak, tinkling sound as the wind blows, to enormous bells weighing thousands of pounds and rung by huge battering-rams.



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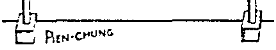
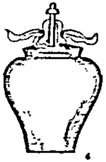
The Chinese were the first people to "cast" bells, that is, to melt metal and pour it into a mold and allow it to harden into the desired shape. The Chinese and their neighbors, the Japanese and Koreans, cast bells long before Europeans thought of making bells of any kind. Some of the old Japanese bells have beautiful

3



BIEN-CHUNG



4

tones,—the bell at Nara, for instance. The bells of Japan and Korea are often wonderfully ornamented, and there is usually a dragon in the design. (Fig. 5.) Figure 6 shows one of the methods of striking a Chinese bell, and the upper picture on page 224 shows a "battering ram" being hurled against one of Japan's big bells.

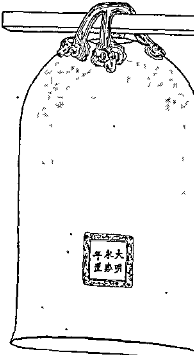

5

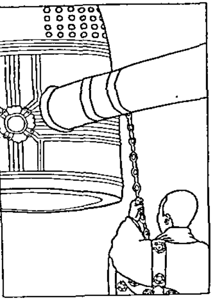
Early in the 15th century A. D., the Chinese Emperor Yung-lo ordered several huge bells to be cast. Three of these bells still remain, and one of them is China's beloved "Big Bell" that hangs in the "Big Bell Temple," which was made for it and stands just outside the city of Peking. The bell is fourteen feet high, thirty-four feet in circumference at the rim, and weighs about fifty-three tons.

There is a legend connected with this bell which probably adds to the great feeling of respect which the Chinese feel for it. According to the story, the daughter of the bell-founder was told by an astrologer that the bell would not be perfect unless the blood of a maiden were mixed with the metal. So to save her father from the wrath of the emperor in case the casting should not be successful, she threw herself into the molten metal just as it was being poured into the mold. This story probably arose from an idea very widely held in China, that self-sacrifice is necessary to insure the public good.

The Burmese, who live in the Southeastern part of Asia, regard the casting of a large bell for public use as a deed of great merit. The bells of Burmah are not


6


BIG BELL



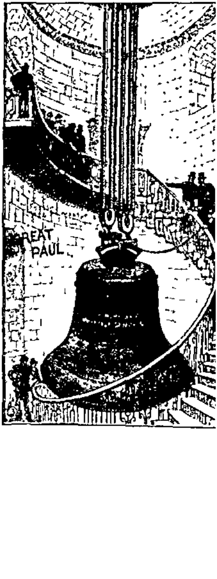
very musical and are used by the Burmese mainly to attract the attention of their gods when they pray. One of the largest bells in the world is in Burmah. It stands on the bank of the river near the city of Mandalay, and weighs nearly ninety tons.

Like the Burmese, the Russians of a few centuries ago came to regard it a deed of great merit for anyone to donate a bell to a church—the larger the bell, the greater the merit. Near the Cathedral of St. Nicholas in Moscow there stands a great bell tower, which was built by Ivan Veliki to hold the bells that were given to the Cathedral. Each story is a belfry. In the first story hangs a huge bell said to weigh more than a hundred tons, and with a clapper so heavy that it requires several men to sway it from side to side by pulling on ropes. It is the largest *ringing* bell in the world.

Perhaps the most famous of all bells and certainly the largest, is one which stands near the Ivan Tower—called the Great Bell of Moscow. It weighs about two hundred tons, and was cast in the spot where it now rests by the order of Empress Anne Ivanovra, nearly two centuries ago. At the time of the great fire in Moscow in 1737, the great bell was cracked before its tone had ever been heard. In 1863 it was raised to its present pedestal. The piece which was broken leaves an opening to the cavity of the bell which has been used as a chapel, and can hold forty people! The picture on page 220 shows the Great Bell of Moscow with the Ivan Tower in the background.

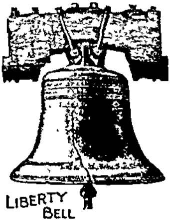
There are many other famous bells in Europe, but it would be impossible to list them all. Germany, France and Italy have scores of bells with interesting histories, and some of them are very old. One of the best known bells of Europe is "Roland," the great alarm bell of Ghent, in Belgium. It was cast in 1343, recast in 1659, and bears an inscription which reads, when translated: "My name is Roland; when I toll there is fire; when I ring there is victory in the land."

England has often been called the "Bell-ringing Isle" because of the love of the English people for bells and bell ringing. "Great Tom" of Oxford, "Great Peter" of York, "Great Paul" of London are well known bells; even more widely known is "Big Ben" that hangs in the tower of the Houses of Parliament in London.



The picture at the side of this page was taken from an old drawing, made at the time "Great Paul" was raised into place in St. Paul's Cathedral.

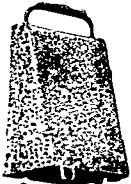
One of the greatest bell treasures in the world is America's Liberty Bell, that hangs at the head of the stairway in Independence Hall, Philadelphia. It was made in 1753—the first bell ever cast in America. Around its shoulder runs an inscription from the Bible, "Proclaim liberty throughout all the land to all the inhabitants thereof. Levit. XXV-10." True to that command, the bell did proclaim the liberty of the thirteen colonies in 1776. Here is a picture of the Liberty Bell. A crack in its side has destroyed its tone, but it will always be cherished as an emblem of liberty.



Few bells are more interesting than the early Christian bells of Ireland. In the year 440 A. D., when St. Patrick went from Gaul to Ireland to convert the Irish to Christianity, he took with him metal smiths to make bells for use in the religious services. The bells which these early teachers of Christianity used were looked upon as sacred, and during the centuries that have followed, they have been preserved with the greatest care. All of them are shaped like our modern cow-bells (Figs. 7 and 8), and several are said to have belonged to St. Patrick himself. One of these is called "the Bell of St. Patrick's Will," and is preserved in a jewelled case made for it in the 11th century. (Fig. 9.) It was supposed to have magic power, and people were often required to swear upon it, as one swears upon the Bible. This was called taking the "bell oath."

7

So many people have believed in the magic power of bells that strange stories have been told about them and their power;—how bell ringing had frightened away an army; of bells that would not allow themselves to be taken away from the churches where they belonged, or that would refuse to ring if taken away; of bells that "go home" every night, or ring of their own accord, or that bring thieves and criminals to justice; of buried bells that ring underneath the ground, and of bells that ring from the bottom of the sea, and frighten sailors. When listening to bells it is easy to imagine that they pronounce certain words, so it is not surprising that we hear many stories about what bells



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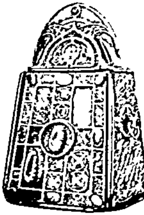

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have said. Everyone knows the story of Dick Whittington, and how the bells of Bow Church in London called him back to the city by promising that he should be three times Lord Mayor of London.

One of the strangest things in the history of bells is the custom of baptizing and christening them, after the manner of baptizing human beings. The people of the Middle Ages believed that baptism gave bells the magic power they were supposed to have. They thought that the ringing of baptized bells drove away evil spirits that were in the air, and could even quiet storms and protect villages from lightning. An inscription on an old bell that was christened "Peter" reads: "Do thou, Peter, calm the angry waves." The pictures on this page were taken from some old drawings showing such a Baptismal ceremony.

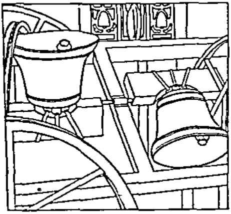
Church bells in times past have been used in so many ways, that one hears of numberless names being given to the different ringings of the same church bell. Here are some of them: The Gabriel bell, to waken the people of the village; the Sermon bell, to call them to hear a sermon; the Christening Peal, to announce a baptism; the Angelus at 6 o'clock as a signal for everyone to stop his work and pray for a moment; the Death Knell when someone in the village died; the Curfew bell to remind people that it was time to cover their fires and go to bed; the Pancake bell which stopped the eating of pancakes on Shrove Tuesday; the Evening bell in winter for those who may have lost their way

in the darkness; the Market bell to announce market day, and also the time to begin buying; the Storm bell to warn travelers; and the Tocsin, or Alarm bell to warn the people of any public danger. In some places the church bell still rings for fire and weddings, and we all hear the Christmas bells on Christmas Eve, and the New Year bells that toll when the old year is dying, and then joyously ring in the New Year.

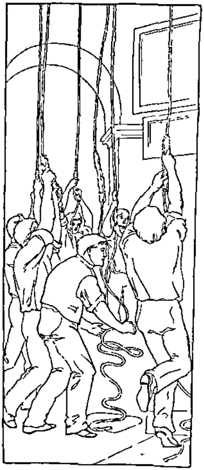
Bell Music: Very early in the Christian era, the people of various European countries began the custom of tuning bells to different scale tones and playing tunes on them, as the Chinese had done long before. Perhaps it was only by accident at first, that the tones of two or more bells happened to make a tune when they were rung, large bells having deeper tones than the smaller ones. This probably led to much experimenting to find out how to regulate the size and shape of the bells, so they would produce the right tones for tune playing.

At first the bells of Europe were made of sheet iron or copper, bent or riveted into shape, and it must have been impossible to plan any certain or definite tones for them. Later when bell-makers began to melt the metal and mold bells, it became less difficult to regulate the size and thickness, and thus to some extent, the tone of the bell could be regulated. Bell metal was made of a mixture of copper and tin, melted together.

When several bells, or even three or four, are made in tune with scale notes so that simple tunes can be played on them, the set is called a *Peal of bells,* and



sometimes a *Chime of bells*. Several centuries ago there developed in Europe, and in England especially, a type of bell music called *peal ringing*. This began in England as early as the 10th century, and it is probable that only three bells were used at first. By the 15th century five bells were used and soon the number increased to eight, as the bell-makers became more expert in casting bells with different tones. Peal ringing consists in playing all the bells of the set in some certain order. The earliest method of peal ringing was to ring all the bells in succession from the highest to the lowest, over and over again, thus: 8 7 6 5 4 3 2 1, 8 7 6 5 4 3 2 1. This was called *round ringing*.



Change Ringing

Later the order of ringing the bells was changed so that skips were made; for example, 8 6 7 5 4 2 3 1, and this was called *change ringing*. There are so many ways of changing the order of ringing the eight bells that it would be possible to ring all day and never use the same order twice. Even in a set of three bells, there are six ways of change ringing:

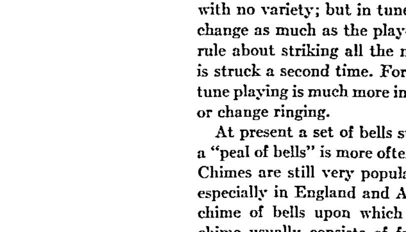
3 2 1; 2 1 3; 1 2 3; 3 1 2; 2 3 1; 1 3 2.

There are 120 ways of playing on five bells, using all five of them each time, and each bell only once. Could you write out all the 120 ways? With a peal of eight bells, 40,320 changes may be rung. It is easy to imagine what fun the English change ringers must have had in trying out all the different changes on their bells. It is no wonder that it became a fashionable pastime in the 17th and 18th centuries, and that England became

known as "the land of bells." Eight people were required to ring a set of eight bells, as each bell had to be carefully managed with a long rope. So people formed themselves into clubs or societies for change ringing, and some of these ringing societies would travel about the country and ring peals in different belfries.

If you have eight glasses you can play at change ringing all by yourself and perhaps find many interesting plans of playing the eight notes in changes. One seldom hears change ringing nowadays, for bells are used more often for playing real tunes. In round ringing and change ringing the rhythm is steady and even, with no variety; but in tune playing, the rhythm may change as much as the player chooses, and there is no rule about striking all the notes once before any note is struck a second time. For these two reasons mainly, tune playing is much more interesting than either round or change ringing.

At present a set of bells such as was formerly called a "peal of bells" is more often called a "chime of bells." Chimes are still very popular, and most large cities—especially in England and America—have at least one chime of bells upon which tunes may be played. A chime usually consists of from eight to twelve bells, enough for playing most hymns and simple folk-tunes. They are rung either by ropes or by hammers and wires, that are moved by means of hand levers or by machinery. Sometimes the wires are attached to the works of a clock, and the bells are struck to mark the hours.



Courtesy Meneely Bell Co

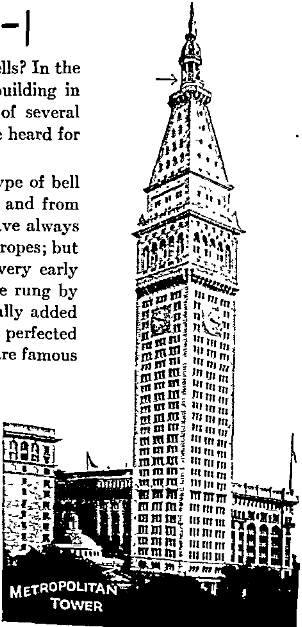
For centuries the musical tones of bells have been used to strike the hours, and nearly every town in the country has a public clock bell. Many clock towers are made with four bells to strike the hours, the bells being tuned to certain notes, and connected with a mechanical device for playing four-note tunes. Perhaps the best known clock tune is one called the Westminster Chime. The bells are tuned to 1, 2, 3, and low 5, and this is the tune:

| 3 2 1 | $\bar{5}$ – – | 1 2 3 | 1 – – |

| 3 1 2 | $\bar{5}$ – – | $\bar{5}$ 2 3 | 1 – – |

Have you heard this tune played by clock bells? In the tower of the Metropolitan Life Insurance building in New York, four bells play it at a height of several hundred feet above the ground, and they are heard for many miles out at sea.

Holland and Belgium have developed a type of bell music that differs from the ordinary chime and from the peal ringing of England. The English have always preferred bells that swing in the air, rung by ropes; but the people of Belgium and Holland began very early to fix their bells in stationary positions to be rung by hammers connected with wires. They gradually added more and more bells to their sets, and finally perfected what is called the *Carillon*. These countries are famous



Courtesy Meneely Bell C

for their well-tuned bells and for the carillon concerts given at regular times for the enjoyment of the public. A carillon usually has two or more octaves of tuned bells, with all the sharps and flats included, so tunes can be played in any key. Wires connect the bell hammers to a keyboard, and this enables the player, the *carillonneur* as he is called, to sit in one place and play all the bells in a large tower. Sometimes the wires are attached to a "drum"—a large cylinder somewhat like the cylinder of a music-box—and the bells are played entirely by machinery. One of the main differences between a set of chimes and a carillon is that the chimes are tuned to the notes of the major scale only, while the carillon has all the tones, sharps and flats, too, just as a piano has. Some carillons have more than fifty bells in the set! Few sounds are more impressive than carillon music floating down from a high tower. The picture below shows a modern carillon.

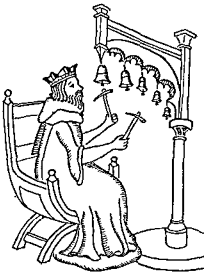
Small bells rung by hand have long been used for tune playing. In old drawings of the musical performances of the Middle Ages, bell ringers are frequently shown, tapping bells with hammers. One interesting old drawing, made about 600 years ago, shows King David playing bells. (Fig. 10.)

Swiss Bell ringers have bells with clappers fastened in a certain way so they can hold several bells in one hand and ring only one at a time. If four bells are held in each hand, one person can play an eight-note tune.

Most people find it very interesting to experiment with the tones of bells, and with other ringing objects

that have bell-like tones. Metal bars, pieces of metal tubing, goblets, and various other things about the house can be made to ring as bells.

Metal bells have one disadvantage when they are used for tune playing. The metal goes on sounding so long that unless the tune is an exceedingly slow one, the tones mix with each other and cause a kind of jangling. This can be overcome by touching the ringing bell when it is time for another bell to ring, and in this way stop, or "dampen" the sound, but of course this is difficult for one person to manage. When glass goblets are used as bells, this trouble is not present, for the goblets do not ring long enough to cause the jangling. If you can find goblets that are naturally in tune with the scale and thus need no water in them, they can be fastened to hang upside down and used as bells.



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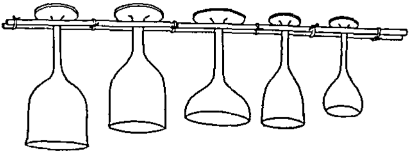
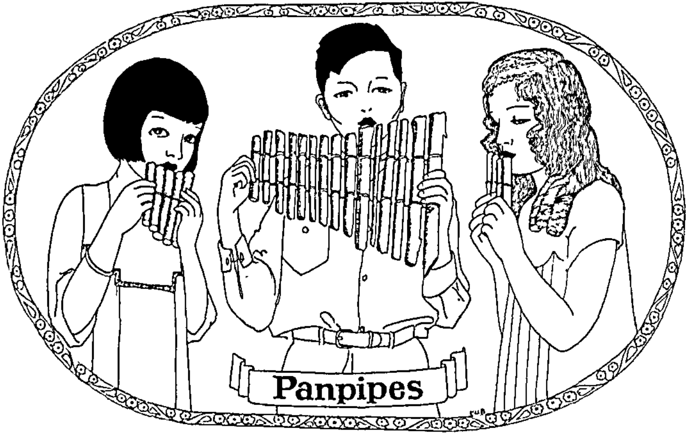
Flower-pots also make excellent bells (see page 58). By taking care in selecting them at the store, it is possible to find enough flower-pots already in tune to play three-note and four-note melodies. One group of children found four flower-pots that were in tune for the first three notes of the major scale and number 5 in the octave below. When hung upside down these flower-pots made an excellent set of chimes on which the children played the famous Westminster clock melody as given on page 231. Can you find flower-pots or goblets that are in tune for a short scale, fasten them so that they swing, and then compose a special bell tune to play on them?




Panpipes

CHAPTER XV

Panpipes

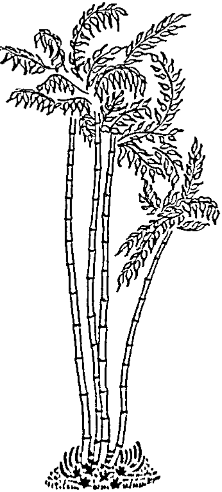
THE drums and rattles, glasses and bowls, which have been discussed in this book so far, have been instruments in which the tone is made by striking something. Instruments which are to be struck are called *Percussion Instruments.* Sometimes musical tones are made by blowing something, and such instruments are called *Wind Instruments.* Almost everyone has noticed that wind makes a sound, even when it blows around the house corner or down the chimney flue. Have you heard the wind blowing in a cave, or across the mouth of a big jar? Perhaps you have blown your breath across the open end of a key, or a cartridge, and have thus made a shrill whistle with the wind of your swiftly moving breath.

For ages people have known how to make musical tones by blowing the breath across the end of a hollow tube, and it must have been very long ago that men discovered how to make different tones, and arrange the tubes so that certain notes would be heard when the breath was blown across them.

You will remember that when the Chinese Ling Lun went into solitude, near the banks of the Hoang-Ho river and heard the phenix bird sing (see page 174) he made pipes of bamboo reeds to match the tones of the

bird song. If the legend is founded on facts, the Chinese people of forty-five hundred years ago knew how to make musical tones from a bamboo reed and how to match other tones with them.

The bamboo is a hollow stemmed plant that grows in many parts of Asia and Africa, in warm islands, and in parts of America also. Perhaps you have seen Japanese furniture made of bamboo, but you may be more familiar with a very small kind of bamboo that is commonly used in this country for fishing rods. Bamboo tubes and other kinds of tubes have been found in the tombs of ancient Egyptians, and also in caves and mounds of other early peoples. This shows that thousands of years ago, men in different parts of the world, knew how to make musical instruments of bamboo and other reeds.



No doubt the people of each country where there are plants with hollow stems have discovered for themselves how to make musical pipes; and if you care to experiment a little you too may discover for yourself how to make a musical instrument to be blown with the breath.

Experiment: First of all, you must find something that is slender and hollow inside and open at one end only. If you have a piece of bamboo—a piece of fishing rod, perhaps—cut off a piece five or six inches long, cutting it so that the solid joint will be left at one end of the tube. A tube like this will hold water. If there is

no bamboo convenient, you may have some other kind of reed; anything that is slender and hollow, and will hold water, will do for the experiment.

Perhaps you can find a glass tube; a "test tube" or a very slender bottle that is shaped like a tube would be an excellent pipe. (Fig. 2.) If you can find none of these, perhaps you may have an empty cartridge or an old automobile valve cap. When your tube is ready, have a cup of water also ready for use.

2

(1) Put the open end of the tube or pipe to your lips as shown in Figure 3, and blow. If no tone comes, put the lips a little closer together, and fix the tip of the tongue ready to say the word "two." Do not say the word, but whisper it, "two!" across the end of the tube, using a great deal of breath behind it. If the tone does not come, keep shifting the tube a little higher or lower against the lip, always exactly in the middle of the mouth, and keep on blowing and whispering "two" until some kind of tone is heard. If you once get a sound to come, even by accident, it will be easy to make it again by further experiment, and finally you will be able to produce a clear strong tone. When you have made a good tone, sing it, or find it at the piano, and try to remember the pitch.

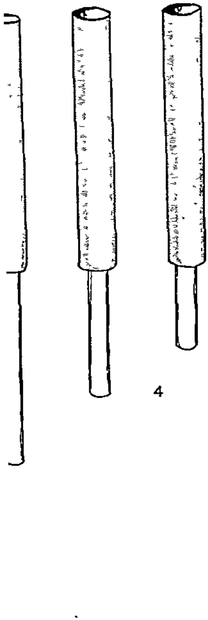
(2) Now fill the tube about half full of water and blow again. Is the tone the same as before?

(3) Pour out the water and try the tone again. What has happened to the pitch?

3

(4) Put water into the tube, a spoonful at a time, until it is nearly full, and blow it after each spoonful is put in. What did you notice about the tone?

The water in the tube does not produce the tone. It is your breath that makes the tone. The water merely changes the length of the hollow part of the tube. Can you now answer the question: which makes the higher tone, a long tube or a short one?



4

If it is springtime and there are willow trees nearby, you may make a willow pipe that will enable you to try this experiment, without using water. Cut a stick of willow five or six inches long. The new growth is best if you can find a piece the right size. It should be smooth and round and as large as your finger. Trim off the leaves and with the back of your knife beat the stick very gently, turning it all the time to loosen the bark from the hard part inside. If you moisten the bark a little, it may help to make it come off more easily, and you must be careful not to crack it in any place. As soon as the bark will move up and down the stick, slip the stick about halfway out, and the bark will be left as a hollow tube, above the stick. Blow across this tube as was directed on page 237, until you produce a good tone. Then slip the stick up or down and blow it again. Change the length of the hollow tube by slipping the stick to various places and see how many different notes you can make with one willow pipe. Can you make the 3-note scale on it? If you could make three different pipes, and adjust each one so that

it would make one note of the scale, then fasten them so they would not slip, you could play a 3-note tune.

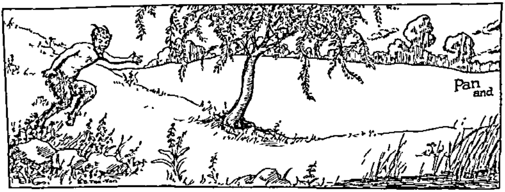
There are hollow reeds that grow in many parts of the country. Bulrushes grow in some places, and in the past few years a reed called the Japanese fleece flower has become common in some parts of the country. It grows up in the spring from roots that remain in the ground all winter, and the hollow stalks are sometimes six or eight feet tall before the summer is over. In the fall the stalks may be cut and dried, and if protected from moisture, they will last for years. There are solid joints about every four to six inches along the stalk. (See Fig. 5.) It is more easily cut than bamboo and may be cut into short pieces, each piece being left with a joint at one end, thus having only one open end. Sometimes the joint lengths in one stalk are all about the same, but they may be cut or sawed at the open end into shorter lengths.

It must have been a reed something like the Japanese fleece flower that is spoken of in the story of Pan and Syrinx. Pan was the strange Nature god who was worshiped by the Egyptians, Greeks and Romans—the ancient god of shepherds and hunters. He was thought of by the Greeks as a wood spirit, half man and half goat. His ears were long, with little horns above them. His legs were hairy, with hoofs instead of feet. He was supposed to live in the groves and forests, and to protect the shepherds' flocks, and he always played and danced with the wood nymphs.

5

One day when Pan was out on the hillside playing with a group of nymphs, he ran to catch one of them whose name was Syrinx. When she saw him running toward her, his hairy goat legs and two little horns made him look so much like a goat, that she was frightened and ran. Pan chased her as she ran down the hill toward the river, and the more she ran, the more frightened she became. When she looked back and saw Pan getting nearer and nearer, she called aloud to the goddess Diana, who was supposed to protect nymphs, and prayed to the goddess to save her from Pan. Diana heard the cry of the nymph and swiftly changed her into a cluster of reeds, growing on the river bank. As Pan dashed down to the bank of the river, he pushed aside the reeds and expected to see Syrinx hiding behind them. He looked everywhere, but no Syrinx was to be found. Finally he gave it up as hopeless, and decided that she must have jumped into the river. In looking for Syrinx, Pan had broken some of the reeds growing on the river bank, and when he accidentally breathed a sigh over one of the broken ends, he started back in astonishment at the sound that came from it. For a moment he thought he had heard again the musical voice of Syrinx, but alas, it was only the sound made by his own breath coming over the open end of the hollow reed!

Even though he was disappointed in not finding Syrinx he had made a great discovery, and Pan became so interested in the sounds he could make, blowing



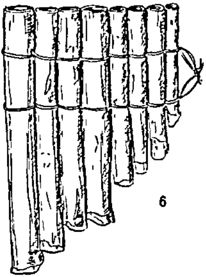
across the different pieces of reed, that he soon forgot all about Syrinx. He settled himself down to make an instrument that would surprise and please the other nymphs, and would also amuse the shepherds' flocks and the animals of the woods.

Pan had discovered that reeds of different lengths gave different tones, so he cut pieces of various lengths, each one with a joint closing it at the bottom, and he trimmed and trimmed until the tone of each piece was just what he wanted. Then he pulled some long dry grass and tied the pieces together in a graduated row, with the longest on one side and the shortest on the other side. When he blew across the pipes from one side to the other it was wondrous music to his ears. Pan loved his pipes so much that he carried them wherever he went, and made the nymphs and all the animals of the woods merry with his playing.

Most of the paintings of Pan, drawn from the imagination of artists who have studied myths, show him blowing his pipes; and instruments made of a row of hollow tubes are even today called Pan's Pipes, Pipes of Pan or *Panpipes*. Some people call a set of such pipes a *Syrinx*, named for the nymph who was changed into the reeds.

The Making of Reed Pipes: If you have reed or bamboo which you can cut, it will be well to begin with one joint four or five inches long, to see what its pitch will be. The length of the hollow part of the tube is what counts most of all, though the diameter of the tube

affects it a little. If you wish your first note to be lower, cut another longer tube and save the first one you cut for a higher note of the scale. Experiment with the tones of different pieces of reed to see how much difference in length you should allow, in order to make a difference of a whole-step in the tone. If Number 3 should be a half inch shorter than Number 2 in order to sound right, about how much difference should there be between Number 3 and Number 4?



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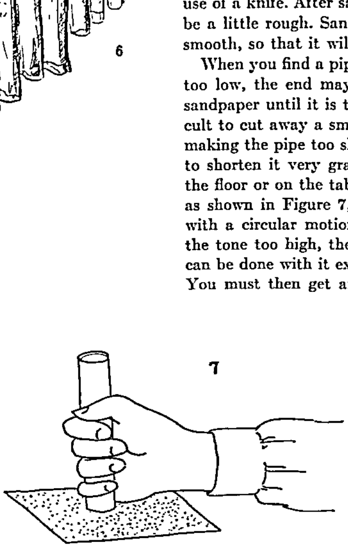
If you make pipes of bamboo reeds, it will probably be necessary to use a saw in cutting the pieces, for bamboo is very hard to cut with a knife. Most reeds are best cut with a saw unless one is an expert in the use of a knife. After sawing a reed in two, the end will be a little rough. Sandpaper this end until it is quite smooth, so that it will not be rough against the lips.

When you find a pipe almost in tune but still a little too low, the end may be filed down by using rough sandpaper until it is the right length. It is often difficult to cut away a small enough portion to keep from making the pipe too short; but sandpaper enables you to shorten it very gradually. Place the sandpaper on the floor or on the table; grasp the pipe in your hand as shown in Figure 7, and hold it firmly as you rub with a circular motion. If you should happen to get the tone too high, the pipe is too short, and nothing can be done with it except to use it for a higher note. You must then get another longer pipe for the note



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you are making. If you need a pipe longer than one joint, push out the partition between two joints and use both of the joints as one pipe. Pipes tuned to the pentatonic scale or to the first five or six tones of the major scale, make a good set for playing simple tunes.

The stems of the elderberry have soft pith in them which can be pushed down until they are hollow enough for panpipes. If you live where it grows, try making a set of panpipes from elderberry stems.

Savages that live in warm countries, where much bamboo grows, make very large pipes and put many of them together. They become very skillful in blowing these pipes. (See the picture below.)

It is possible that you may have no reeds or bamboo or elderberry to use in making pipes of pan, but there are other things to be found in almost any home, which may be used for musical pipes. Bottles, for instance, make very good pipes. Try the tones of different slender bottles by blowing across them when empty and see if you can find three bottles that make the 3-note scale.

If you can find four bottles, small enough for your two hands to hold all four of them up to the mouth, you can play 4-note tunes on them. One who has good use of his hands can manage three bottles of almost any size, for playing 3-note tunes, and it is quite possible to manage five and six bottles in your hands if the bottles are slender enough. When the shapes are suitable, they may be fastened together and held more easily.

Courtesy Merle La Voy

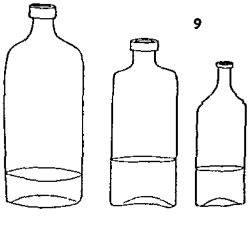
Panpipes in the Solomon Islands

Of course bottle pipes cannot be cut shorter, but the length of the hollow part may be regulated by putting water in them. Your experiment on page 237 will make it easy for you to tune a set of bottle pan pipes.

Can you play "Hot Cross Buns" on three bottles? Is it not strange that more water in a bottle makes the tone higher when you blow it, but when you are playing bottles by striking them, more water makes the tone lower? How is it with glasses? How do you explain the difference when you are using the bottle as a wind instrument and as a percussion instrument?

8

One day John found a pan on the stove with some beeswax in it which had been left over from something his mother was making. It had been melted but was gradually getting hard again, and when he found the wax it was firm enough to be handled, but soft enough to be mashed and have its shape changed. John lifted the soft wax from the pan. His first thought was that he would like to press this lump of wax into the shape of a man's face, so he asked his mother's permission to use it. He then found a long stick about the size of his finger, made the wax into a ball, and stuck the stick into the ball of wax, as a sort of handle to make it easier for him to work with the face he wished to make. He fastened the stick into his work-bench vise, moulded the waxen face with his fingers and left it in the vise to harden. Next morning he took it from the stick. Of course the wax was firm and hard, and there was a



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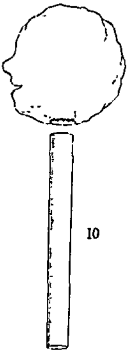
hole almost all the way through it. The hole was of no importance to the face of the man but it soon led John to make a very important discovery which had nothing to do with his first plan.

John was always experimenting. As soon as he saw the smooth hole in the wax he put it to his lips and blew across it just for fun. Imagine his surprise when he heard a clear musical tone coming from the beeswax! Again and again he blew it, showing the family what a wonderful voice his waxen man had! While he was blowing, an idea came to him; he would get some more wax, melt it, let it cool until it should be only as firm as the wax he had found the day before. Then he would put two or three sticks at different depths into the lump of wax, leave them for the wax to harden, take them out and see what he would have! You can probably guess the result of John's experiment. (See Fig. 11.)

One nice thing about waxen panpipes is that the holes can be made just as deep as you wish, at least if there is wax enough. You can take the stick out while the wax is still soft, try the tone, and if it is not low enough, push the stick further in until the tone is right. If the tone should be too low, the hole may be shortened by putting in a little soft wax and pressing it to the bottom with the stick. Use a round stick with a smooth, rounded end. A lead pencil will do, but a piece of doweling is better. A little experimenting with the wax will help you to find out the things you need to know.



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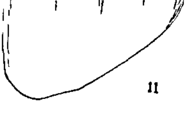

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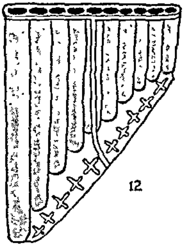
In softening the wax it is important that it shall be of the same firmness all the way through, and for this reason it is necessary that it should be heated or cooled very slowly. If it gets too soft, let it cool before handling it. Sometimes the heat of a house radiator is about right, if the wax is left in a pan on the radiator for some time.



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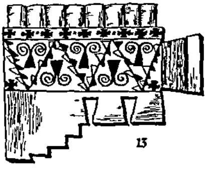
If you have only a small piece of wax it may be melted and mixed with two or three times as much paraffin, and the mixture will answer as well as if it were all beeswax. While it is melted you can put coloring matter in the mixture, if you like pipes of gay color.

If you have any way to get some potter's clay, you can make panpipes of clay in somewhat the same way as the wax pipes are made.

Many centuries ago the Aztec Indians of Peru, in South America, made panpipes of clay. They did not call them panpipes, for they probably never heard the legend of Pan and Syrinx. The Peruvians called their pipes *Muayra-puhura.* They made them of clay and of certain kinds of stone. The set shown in Figure 12 is of baked clay, that in Figure 13 of soapstone. Each of these was found in an ancient tomb. Figure 14 shows a set of Japanese pipes made of metal.

Glass test-tubes also make splendid panpipes, and they may be tuned with soft paraffin or clay, using a round stick for a "ram-rod." If you can find three or four tubes, tune them and fasten them together with



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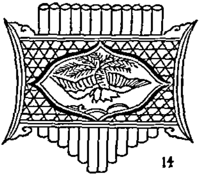

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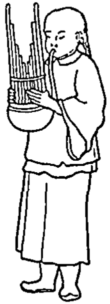
glue. Then glue strips of cardboard or wood across them to hold the tubes more firmly, and tie the ends of these strips together, as shown in Figure 15.

Any of the tunes you know may be played upon pipes if you have the right number of notes. Select your tunes according to the number of pipes you have.

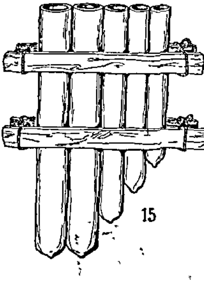


Cheng

The ancient Chinese found a way to make tones on their musical pipes by forcing air into a little slit cut in the side of the pipe. In time they developed an instrument consisting of several pipes fastened into a bowl that looked like a teapot, the wind for playing the pipes being blown into the bowl through a long spout. This instrument is still used in China, and is called a *Cheng*.

Centuries afterward, the Europeans tried the plan of placing a row of panpipes in a long box for a "wind chest," and following the Chinese idea, they cut a slit in each pipe, near the closed end. They forced air into the wind chest with a bellows and thus a primitive *Organ* was invented. Did you ever play an organ and find that you had to press your feet on pedals—moving the pedals up and down—before you could make the keys sound? If so, your feet were working a kind of bellows to force wind into a set of panpipes.

On page 248 you will find a picture of one of the first organs ever made, and another that shows a kind of organ used in Mediaeval times.



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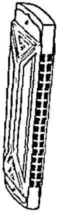
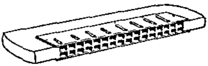
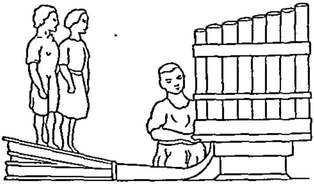
There are now two kinds of pipes in organs: the "flue-pipe," in which the tone is made by the wind striking against the sharp edge of a slit made in the pipe, and the "reed-pipe," in which the tone is made by a vibrating tongue of metal in the side of the pipe, set in motion by the air bellows. Perhaps you have heard of a *Reed Organ*. In this kind of organ, the tone in each pipe is made by a vibrating tongue.



Almost everyone is familiar with the small instrument called a *Mouth Organ* or *Harmonica*. This is really a kind of reed organ. If you remove one of the tin coverings on the side of a harmonica, you will see a row of small metal tongues fastened so that they vibrate over smaller openings, cut in the side of the harmonica. The breath goes through the hollow passage and starts a tongue to beating against the edge of the opening, and this vibrating metal makes the tone. You will notice that these metal tongues are of different lengths to make the different tones, just as panpipes are of different lengths.



Every hollow pipe of the harmonica has two vibrating tongues, one on each side. They are so placed that when the breath goes in one direction, one of them vibrates, but the tongue on the other side will not vibrate until the breath comes from the opposite direction. This is why, in playing a harmonica, you have to draw in your breath as well as to blow it out.



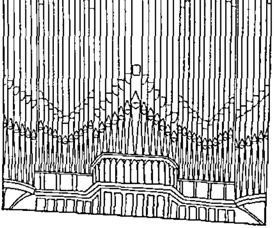
Primitive Organ

Medieval Organ

Have you experimented with a harmonica to see how the scale can be played? If you find how the scale is made, you will be able to play tunes. Many people cover the instrument with the hands while they play, and then lift the fingers at times in order to give variety in loudness and greater expression to the music.

When it is well played, the harmonica is a delightful little instrument, but one should be careful that it is always kept very clean and dry, and that no two people play the same harmonica, else it may become a carrier of cold germs.

Flue-pipes and reed-pipes are both to be found in the *Church Organ* or *Pipe Organ* of today. Organ builders have found various ways of making these pipes imitate different wind instruments and stringed instruments of the orchestra. Perhaps you have noticed the rows of "stops" on an organ which may be pulled out when the player wishes to change the tone quality of his music. Through a long series of inventions, the pipe organ has come to be the most magnificent instrument in the world, but its early ancestor is only the simple little panpipe.




Horns and Trumpets

CHAPTER XVI

Horns and Trumpets

THERE are various ways of using air for musical sounds. When you pucker your lips and blow, as if you were blowing out a candle, there may be a very gentle sound, but not a tone. If, however, you pucker the lips tightly together and whistle through them, there comes a tone with a definite pitch. The tone is produced when you arrange the lips and tongue so the breath comes against the lips in a certain way.

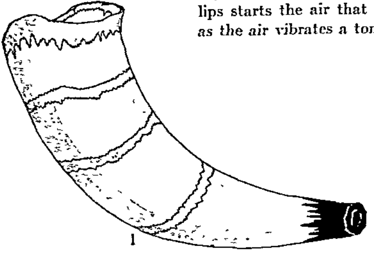
Now instead of tightening the lips as for whistling, loosen them, let them touch, but make them very loose and flabby, and blow the breath with a little force so that both lips will flutter as a leaf flutters in the wind. The fluttering lips will now make a sound that is neither like whistling nor blowing out a candle. It may take a little practice to get the lips in the right position to flutter freely, for you may not have made a sound of this kind for years. It is quite likely that you did when you were very young. When babies first find out that they can make this peculiar noise with their lips they usually make a great game of it, and amuse themselves with the sound.

When you have learned to make a sound by fluttering the lips, you will have only one more thing to practice in order to blow a bugle.

Put the lips tightly together and blow a tiny stream of air through them, in the center, letting them flutter only in the one place where the stream of air comes through. When you have the central part of the lips fluttering properly, with the sides of the mouth held firmly together, there will probably be a tone something like the buzzing of a bumblebee trying to find his way through a closed window. It may help if you protrude the lips as though trying to turn them wrong side out. The sides of the mouth must be held very tightly, and the breath must come with a good deal of force. The sound is not at all musical, but you will soon be able to convert it into a sound that is musical.

Take a stiff piece of paper, roll it into a long roll about one inch in diameter, put it closely against the mouth, with the central part of the lips free to flutter inside the tube. Now make the bumblebee sound again and see if the paper changes the sound in any way. Be careful not to let the sound come from the sides of the mouth—only through the part that is inside the tube.

Have you ever talked through a long tube of paper or cardboard just to hear the strange rumbling of your voice? Any sound that comes through a long tube or hollow place is changed. In the case of fluttering lips at one end of the tube, the rapid motion of the lips starts the air that is in the tube in motion, and as the air vibrates a tone is heard.



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Blowing across the top of a closed panpipe sets the air in the pipe in motion, and a certain kind of tone is heard. If you start the air in an open tube to vibrating, another kind of tone is the result. There are several ways of setting the air of an open tube in motion. The use of fluttering lips is one way, and it is the way tones are made in horns and trumpets of all kinds.

No one knows how long ago man discovered that he could make a tone by having his lips flutter into something hollow. He may have found the long hollow bone of an animal, or perhaps the horn of a wild cow or buffalo with the small end broken in battle, and he may have found out quite by accident how to make the sound. Imagine his surprise when a loud tone rolled out from the big end of the horn! Here was something that would scare away wild animals, and perhaps frighten his enemies when he went to war!

At first the horn was merely a useful instrument, serving the needs of savage man in two ways. It was used to strike terror into the hearts of his enemies and thus bring greater success in war, and it was also used to give signals to the members of his own tribe. Whether he used horns for signalling his friends or for terrifying his enemies, those which gave tones with the greatest carrying power were the ones he most prized. Gradually he contrived to make them longer and longer, with ever deeper and more powerful tones. If the sound of a ram's horn was shrill and piercing, imagine how terrify-

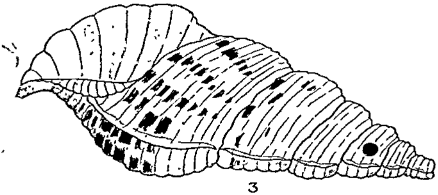
2

ing must have been the sound that came from the long ivory tusk of an elephant held up by two or three men and blown by the lustiest horn blower of the tribe! Travelers in New Zealand have seen native war horns made of wood that were sometimes as much as seven feet in length, and whose ghastly sounds could be heard several miles away.

The solemn and impressive tone of a large horn must have suggested to man at an early date that the instrument would be very useful in his religious ceremonies. If the gods would listen to the sound of a drum, how much more readily would they listen to the sound of a horn! It has thus come about that in almost every country of the world, horns have been used at some time, for religious purposes.

It is a common mistake to call all primitive horns "trumpets," but all horns are not long enough or straight enough to be called trumpets. The main difference between a horn and a trumpet is that the trumpet has a long tube of about the same diameter nearly all the way, while a horn is shaped so that it gradually grows wider and wider from the mouthpiece to the bell end.

Nearly all people who live near the sea have made practical use of large sea shells as horns. Figure 3 shows a sea shell with a hole bored in the small end for blowing. It is often called a "sea shell trumpet."



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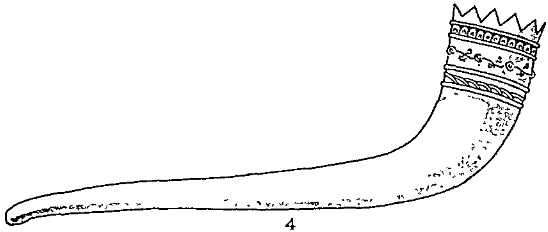
Among some primitive peoples large roots with a pithy inside are hollowed out and made into wonderful trumpets. The American Indians make trumpets of long rolls of birch bark.

From very ancient times civilized people have made horns and trumpets of metal, generally of brass. In the Bible we are told that Moses made trumpets of solid silver that were used to call the tribes together. These were probably straight trumpets about two feet long. It was Moses, too, who commanded that a curved horn called the *Shophar,* should be blown in the temple at some of the religious ceremonies. The shophar is still blown in the synagogue on the Jewish festival of the New Year. It is the only musical instrument of the ancient Hebrews used at the present day. (Fig. 4.)

The sculptures of the ancient Assyrians show that they, also, used trumpets in their religious services.

Horns and trumpets were much used by the early Greeks and Romans as signals. They were blown whenever heralds made a proclamation and also in military movements. In the famous Olympic Games of Greece, when the greatest athletes, poets and orators of the world used to compete for prizes, there was always a contest of trumpeters, and the names of some of the winners are known to us today. Among them perhaps the most famous of all was Herodorus of Megara, who gained ten prizes in succession and was crowned victor



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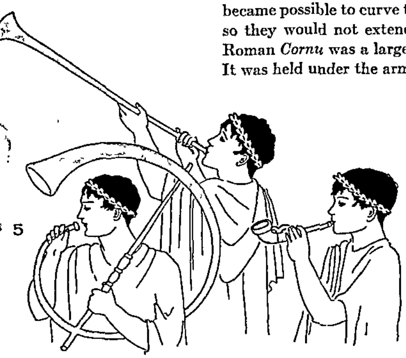
four times in a single year for his wonderful trumpeting. His music was so loud, we are told, that the audience was sometimes stunned by the sound concussion! He was of giant stature and slept on a bearskin in imitation of Hercules and his lion skin. It is said that he could play on two trumpets at the same time, and when he did so the audience had to sit farther away than usual, on account of the immense volume of sound. His performances were of great use in military affairs. Once at the siege of a city the troops were giving way when Herodorus began to sound his two trumpets, and the warriors were so inspired that they returned to the fight and won the victory.

From this and other stories we are led to believe that at the Greek games the trumpeting must have had a most noisy character. Indeed, we know that trumpeters were appreciated mostly by the loudness of their blowing, and that many injured themselves by bursting blood vessels in their zeal to make a great noise.

The long horns and trumpets which were made by ancient peoples were sometimes difficult to handle, especially when they were more than four or five feet long. But when the metal workers began to make horns, it became possible to curve them around the player's body so they would not extend so far in front of him. The Roman *Cornu* was a large curved horn made of bronze. It was held under the arm of the player with the broad



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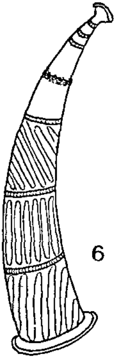
end curving upwards over his shoulder. (Fig. 5.) The *Tuba, Lituus* and *Bucina* were all used in the Roman army for signalling. The tuba was a straight trumpet. The lituus was bent at the big end but straight the rest of its length. The bucina was a ruder instrument, perhaps a conch shell or the horn of an animal.

In Europe in the Middle Ages the knights carried horns that were made of ivory and very richly carved. Some were made from an elephant's tusk and these were called *Oliphants*, from the word olifaunt, which means elephant. (Fig. 6.) Their sound was supposed to have a magic power. In some of the early writings that tell of Roland, the famous nephew of Charlemagne, it is stated that his horn could be heard thirty miles away. It should not surprise us then to learn that the wounded Roland died after one of those terrible blasts. In those days much use was made of hunting horns, and there were also the forester's horns, that were carried by people who lived in the forests and other lonely places. All of these were used to drink from as well as for blowing. On festive occasions the knight or hunter would put his finger over the mouthpiece so that it would hold the wine, drink from the big end and then blow the horn to show that it was empty.



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In those rough days people depended on their horns to call their friends to help them when they were in danger, as they very often were. Many of the stories

and legends of that time show how important the horn was to its owner. Anyone who has read of Robin Hood's adventures, for example, will remember how often and with what good effect his horn was blown.

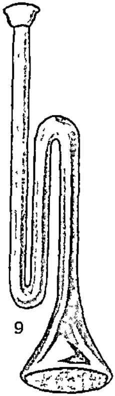
The heralds of the Middle Ages who rode before the armies going into battle, blew their trumpets and proclaimed the greatness of their leaders and the justice of their cause. At tournaments too, the heralds and their trumpets had always a most important place.

From early days, and in many countries horns were used by hunting parties to add cheer to the occasion as well as to give signals to the hunters.

As time went on, horns of metal became more and more popular with huntsmen, and the long *French Horns* bent like the one shown in Fig. 8, came into use. A great variety of tunes and calls could be played on these. There were first of all the "calls" meant to cheer the hounds, to warn of danger, to call for aid, and to give other signals. About thirty of these calls were used by the royal hunting parties in France. Then there were the "fanfares" giving signal as to which animal had been sighted. There was one for each animal and several for the stag, according to his age and his antlers. There were also "fancy airs" that were played as signs of joy after a successful hunting. Even the kings of France sometimes composed hunting calls and fanfares, and a few of these are still used.

7

In your experiments with horns have you noticed any difference between the tones of the long and short ones? Just as the longer panpipes make lower tones, so do the longer horns make lower tones, and those people who wish for very deep and solemn tones in their horns try to make the longest ones possible. Instruments such as the old Greek and Roman trumpets, being straight tubes with bell mouths, cannot be conveniently handled if more than about four feet long. The winding and doubling of the tube as we see it in horns of today, is said to have been adopted about four hundred years ago, when people began to make metal instruments of greater length. They found that these could be handled better if they were wound or doubled together, or perhaps wound in various directions. In many horns of today the tube is twice doubled in an oblong shape. (See bugle, page 263.) Figure 9 shows an old trumpet with but one fold in the tube.



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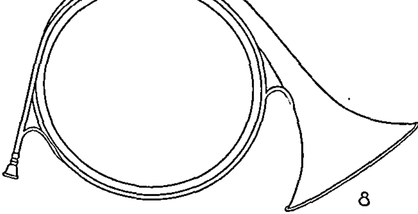
You may have noticed that bugles and other horns have a certain kind of mouthpiece at the blowing end, one that fits closely to the lips and is hollowed out like a cup. This little mouthpiece makes the horn easier to blow, because it fits the lips, and at the same time the little cup-shaped part gives room for the lips to flutter freely. (Figs. 10, 11.) If you are good at whittling you can make a mouthpiece from an empty spool and use it for all your home-made horns and trumpets.

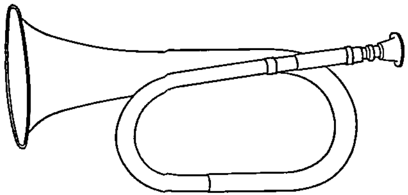


8

Horn Harmonics: An expert in blowing a horn can sound not only one clear note, but several different notes by changing the force of the breath and the tightness of the lips. The lowest tone of any horn is the tone which comes when the least effort is made with the lips and there is only an easy pressure of the breath. This is called the *fundamental* tone of that horn, or Number 1 of the scale. Harder breath pressure and more tightness of the lips will give the octave or Number 8, and various other pressures will produce Numbers 5 and 3 of the octave above, and sometimes 7-flat. There is a natural law which makes the air in a tube produce only certain tones of the scale when different pressures are used. These notes are called *harmonics*. Can you make more than one note on your horn? After you have made the fundamental, blow again with the lips tighter, using more breath force, and see if you can hear the first harmonic or octave above the fundamental. The principal harmonics are always some position of 1, 3 and 5.

On a short horn, such as a cow horn, it is difficult to make more than one harmonic, but in horns where the tube is longer, the harmonics come more easily. This is another reason why people like long horns.

Simple Horns and Trumpets: Several kinds of horns have developed from the old time hunting and war horns. They may be divided into groups according to



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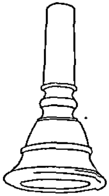
the way they are made for tune playing. In the first group we will place the natural horns and the trumpets of olden days,—those that give only the harmonics which have been described,—and we will call them "simple" or "natural" horns and trumpets.

The Bugle is a familiar simple horn with a tube long enough to allow the player to make several notes. Six harmonics are usual in an ordinary field bugle. The word bugle takes its name from the wild ox (or "bugle") whose horns were blown for signalling in former days. The bugle of today is also used to give signals in camps, among boy scouts, and in regular armies.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Most people are familiar with the various "calls" of the bugle, which employ only the tones 1, 3, and 5, either high or low, of the particular scale of the instrument used. Another bugle with a tube of different length will have a different fundamental tone and its notes will be in a different key from those of the first bugle, but all its tones will still be 1, 3 or 5 of the scale built on its fundamental tone, and any tune it plays must be some arrangement of those tones.

A few of the bugle calls used in the army are given on page 262. If you can find a hollow tube that is as long as a bugle tube you may be able to play some of these tunes, just by experimenting with your breath pressure and tightness of the fluttering lips.

Assembly

I

Taps

II

Recall

III

Reveille

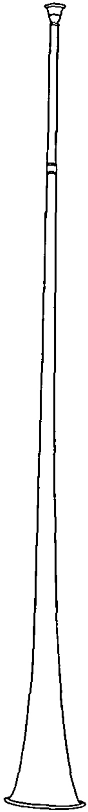
IV

Simple or natural horns like the old fox hunters' horns may be either short or long, curved or straight. They may be shaped either like a cone or a cylinder. A lip-blown instrument with a long tube of the same diameter throughout most of its length may be properly called a trumpet. A metal trumpet has a clear, brilliant tone and has been used for centuries in processions and by heralds, to announce the coming of important people. (Fig. 7.) Like most lip-blown instruments it has *a flare or bell at the end.* In the early days of the trumpet's development the *Clarion* was famous for its high, penetrating notes. It was made with a small tube and a shallow mouthpiece.

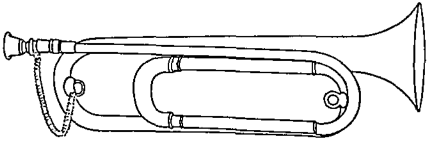
The longest of all the simple horns were the old-fashioned French horns. Some of these were eighteen feet in length and capable of producing sixteen harmonics. Of course so long a horn had to be wound around into circular shape.

How many kinds of simple horns and trumpets have you been able to make and to blow? Have you tried a sea shell with a hole bored in the small end? The triton sea shell (Fig. 3) has a long winding tube inside that grows gradually larger and larger. Would it be more properly called a horn or a trumpet?

Have you made trumpets of hollowed out cornstalk? Of birch bark rolled up? Of cardboard? Of metal tubing? Of a long strip of tin rolled up? Of water hose? Long gourds? How many different tones have you been able to make on one trumpet?



Coach Horn



Army Bugle

Sliding Trumpets: Have you seen brass curtain rods made of two tubes, one of which slips into the other, so the rod can be made long or short to fit the width of the window? Have you ever used one as a trumpet, trying the tone as you drew it out to different lengths? There must be no cracks in either tube if an experiment of this kind is to be successful.

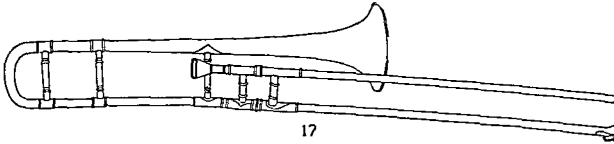
At some time in centuries past someone worked out the plan of making a long trumpet with two tubes, one fitting snugly into the other. The length of the trumpet could then be changed by sliding one of the tubes in and out. This must have been thought of very long ago, perhaps when people first began to make trumpets of metal, for it is said that the ancient Romans had slide trumpets. In any case we know they were used in Europe at least a hundred years before Columbus discovered America.

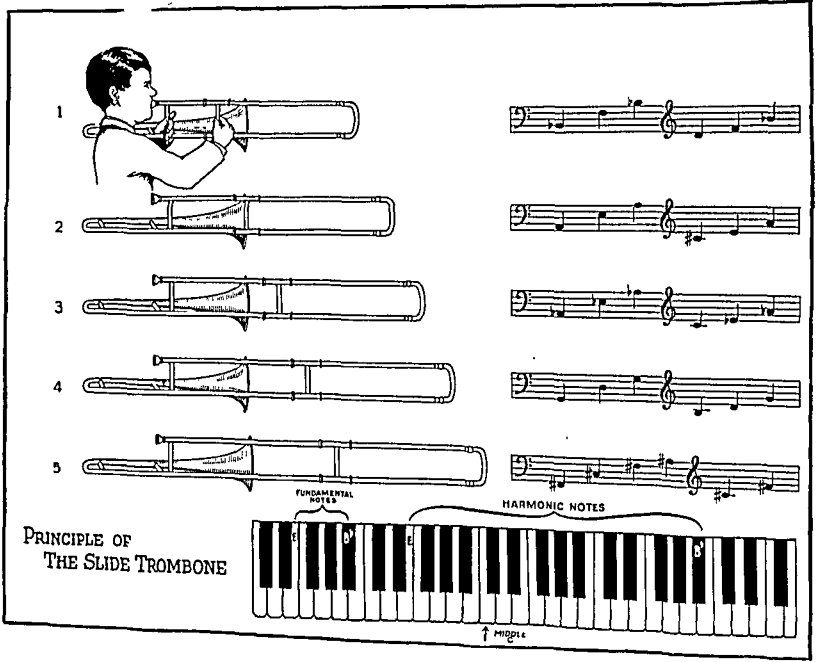
Since the two tubes must fit closely together, it will be easily seen that only horns of the trumpet kind, those which do not taper except near the end of the tube, can be used in this way. It will be evident, too, that the extra tubing can be used only in the center of the tube, before the enlargement for the bell end begins. The slide trumpet was probably straight at first, but for the convenience of the player the straight part was doubled back in the center making the instrument much shorter. The Italians used to call this "the broken trumpet." It is known to us by the name of *Trombone.*

Although invented so long ago the trombone is still one of the most important instruments used in our brass bands and orchestras of today. Its tone is rich and full and it is capable of both very loud and very soft tones. When very soft tones are desired it is "muted" by putting a pear-shaped "mute" into the bell. The free-running telescope slide permits of very fine adjustments and all the notes of the scale can be made on the instrument with great accuracy. There is a bass trombone which is so long that it requires a jointed handle, for the player's arm is not long enough to pull it out to the position required for its lowest notes.

The pictures on page 266 show the trombone both closed and extended. They give an idea too, of the way in which the different positions of the slide make it possible to play the chromatic scale on the instrument. It will be remembered that the vibration of air in a tube of any certain length will produce only certain notes, the fundamental tone of that tube and its harmonics. For example, let us suppose the tube of the trombone sounds B-flat as its fundamental or lowest note when the slide is in the position marked 1. Then we know the tones B-flat, D and F, the harmonics of B-flat, can also be made with the slide in this position.

By changing the slide a little and making the tube longer, we can reduce the fundamental tone one half-step, as in the position marked 2. Then the notes will be A and its harmonics, A, C-sharp, E. Making the





PRINCIPLE OF THE SLIDE TROMBONE

tube a little longer still, as in position 3, will give us A-flat as the fundamental and the harmonics A-flat, C, E-flat. Position 4 will lower the fundamental one more half-step to G, the harmonics being G, B, D. Position 5 will give F-sharp, A-sharp, C-sharp. Thus by adjusting the tube of the B-flat trombone to five different lengths, a chromatic scale of 22 notes can be played, if the player knows how to make the various changes of both slide and breath that are needed to produce them. To remember this will help us to understand the principle on which many modern instruments of the horn and trumpet kind are constructed.

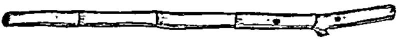
Two more positions are possible on the B-flat trombone, and these increase the range of its chromatic scale by lowering the fundamental tone from F-sharp to E. The harmonics then include every half-step from B-flat above Middle C, to E in the second octave below it, 31 notes in all. Can you find the range on the piano and play all these notes in a chromatic scale?

These are all harmonic notes and only the harmonics are shown by the staff notes pictured on page 266. In each position the fundamental tone is an octave lower than the first harmonic note. Thus the fundamental notes of the B-flat trombone in each of its seven positions, *form a group of seven very low notes that* range from the B-flat to the E below it in the third octave below Middle C. Can you find this group of fundamental tones on the piano?

Trumpets with Holes in the Tube. Experiment: Select your best straight trumpet, one that is easy to blow. Bore a hole in one side of the tube, about one quarter of its length from the outer end. Make the hole small enough to be covered entirely by the end of one finger. Now blow the trumpet with the hole open. Blow it again with your finger covering the hole. Is there a difference between the two tones? Bore another hole half way between the first hole and the end of the tube. Put a finger of each hand over a hole and blow again. Can you make three distinct tones on your horn? Does this give you an idea of the way to sound different notes on a horn without doing all the work with your breath and lips?

After the natural horn had been in use for a long time someone discovered—it may have been by accident—that a hole in the side of a long horn or trumpet changed the pitch. They knew already that short tubes gave higher notes than long ones. A hole in the side of the tube allows the air to escape and thus makes the vibrating column of air shorter. So now the discovery was made that one horn could be used to take the place of several horns of different lengths. This was a most useful thing to know. Careful planning and placing of the holes made it possible for horn players to play melodies much more easily than when all the tone changes were made with the breath and lips.

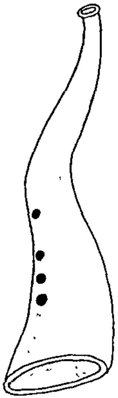
If you wish to play a 3-note tune on your trumpet, you will need to make two holes, and play it with



3-Note Trumpet

both holes closed for Number 1, one hole open for Number 2, and both holes open for Number 3. If your trumpet is made of reed it will be easy to burn a round hole in it with a red hot iron rod of some kind. The first hole may be placed about one-eighth the length of the horn from its outer end. You will have to experiment with the size of the hole, for its size affects the tone. Do not make it too big at first, for it can always be made larger more easily than it can be made smaller. It should usually be much smaller than the diameter of the tube, never any larger. Try the tone and see if the hole is in the right place. If it sounds too low, the hole must be moved up a little toward the blowing end of the tube. If the tone is only a little too low, enlarging it on the upper side may be all that is needed. But, if that will not work, plug it up and burn or bore a new hole, nearer the outer end of the tube. Experience is a great help in placing the holes properly, as you will find when you come to make your second instrument of this kind.

When tone Number 2 sounds right, bore the second hole, making the distance between the two holes a little less than the distance from the first hole to the outer end of the tube. If this is not just the right place for it *you will know how to experiment until you have it* right. The picture on page 268 shows a home-made 3-note trumpet made from a hollow stalk of reed. It is more properly called a *Cornet* or *Zinke*.



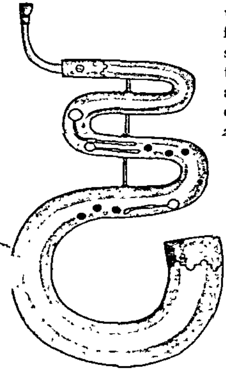
Zinke

In Germany in the old days an instrument made from

a tube of wood with holes in it was called a *Zinke.* It was generally covered with leather and had holes in front for the fingers, and one underneath for a thumb. (See picture, page 269.) In France the same kind of instrument was called a *Cornet* and that name has remained with us, though the metal cornets we use today do not have their tubes shortened by means of holes and fingers.

The *Serpent* (see picture below) was a strange kind of horn with holes in it for making different notes. It was curved into its serpent shape, so the tube could be very long and yet allow the player to reach all the holes with his fingers. It was a very popular instrument at one time and was finally improved by the addition of keys. Other instruments with keys and having various names came after that. The keys were an important invention and offered a great advantage over the old way of closing the holes by fingers, for the keys could be made with long handles so that one end was always within easy reach of a finger.

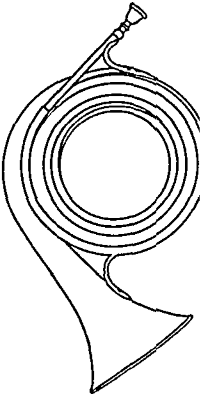
Horns made with holes are not very common today, however, for modern horn makers have found other ways of making different tones that are more satisfactory and more exact. As long as holes were used for shortening the tube, some of the tones escaped through the hole and some through the bell end of the tube, and the tone qualities of these being different, the musical effect was often marred. So we seldom hear of the zinke or the serpent nowadays.



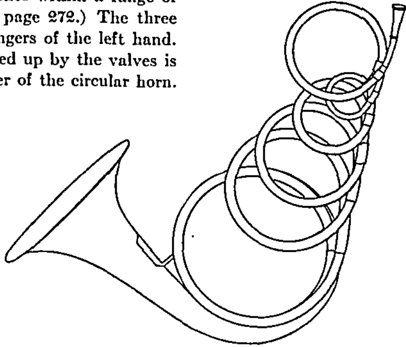
Serpent

Horns and Trumpets with Valves: Finally someone invented a device by means of which the round, coiled-up French horn and other simple horns of that type, may be made longer at the wish of the player. The changes in length are made by the use of *valves.* Each valve acts in such a way that it throws open an extra loop of tubing that is attached to the main coil. This additional loop of tubing is shut off entirely from the main tube, except when the valve is opened by the touch of the finger, and the two tubes are connected. Four extra pieces of tubing of different lengths, and four valves to throw them into connection with the main tube as they may be needed, are all any kind of a horn requires to make it give all tones within the highest and lowest notes of its range. Three valves are sufficient for the needs of many instruments. The valves that are used in modern brass instruments were invented only in the last century, and they have been of great help in the development of the brass instruments of the orchestra, and have made it possible for the music of the horns to be beautiful and expressive.

The *French Horn* which in former days consisted of from nine to eighteen feet of coiled brass tubing, is today only twelve feet long, and by the use of three valves it can produce all the tones within a range of three and a half octaves. (See page 272.) The three valves are operated by three fingers of the left hand. The extra tubing which is opened up by the valves is shown coiled about in the center of the circular horn.



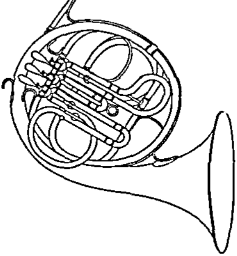
Old French Horns



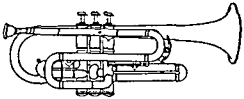
The mouthpiece is small and funnel-shaped rather than cup-shaped. The right hand of the player is placed inside the bell as a sort of mute or muffler to keep the tone from being too harsh. In this way the tone of the horn is sweet and mellow and blends with the other instruments of the orchestra. Thus the signal horn and the hunter's horn have at last developed into a real musical instrument of beautiful tone and under excellent control, an instrument that belongs to the orchestra instead of to the battlefield and the chase.

The *Valve Trumpet* of the modern orchestra has a tube only about half as long as that of the French horn. The trumpet, therefore, makes higher notes. The tone is brilliant and penetrating but may be made soft, as in the case of the trombone and other horns, by putting a pear-shaped mute into the bell. The trumpet is very effective when played properly and most of the great composers have made impressive use of it.

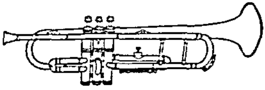
The *Cornet* of modern days is a smaller instrument than the valve trumpet, and its tube is slightly conical instead of cylindrical. It has three valves. The cornet is often played as a solo instrument and is very important in military bands and in small orchestras.



Modern French Horn



Cornet

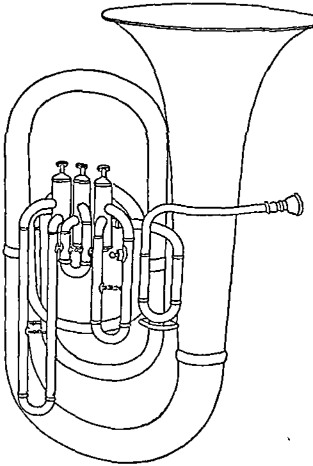


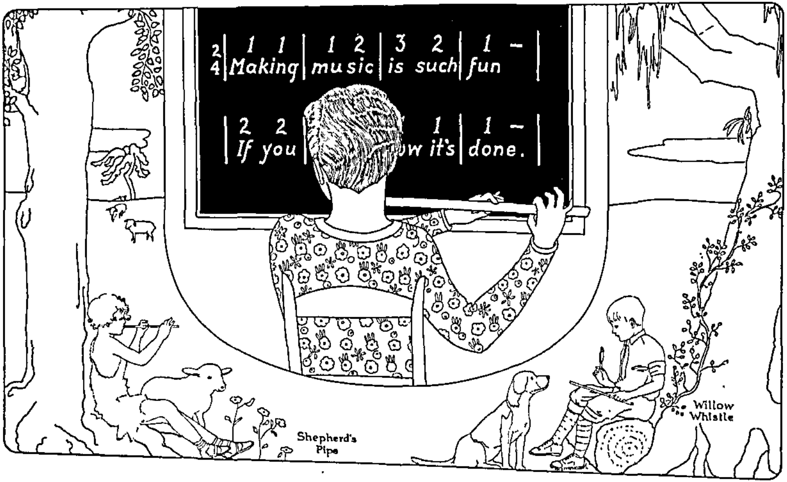
Trumpet

The *Tuba* may be thought of as an enormous cornet having a tube that gradually widens from the mouthpiece to the bell. It may have either three or four valves and gives the lowest note of any brass instrument in the orchestra. Its characteristic tone is deep and organ-like, but it is also capable of brilliant tones.

After reading this chapter look carefully at the picture on page 250, and see how many of the different horns and trumpets shown in it you can name. Perhaps you can tell something about each one, its history or how it is made. The picture represents a pageant of horns and trumpets, and each child in the *pageant* chose his instrument, and found out how its player ought to be dressed, so as to wear the proper costume. Perhaps you and your friends can plan a pageant of horns and trumpets. If so, which instrument would you choose? *Would you be able to carry a real one, or would you have to invent a way to make it, or perhaps make something only to look like it?*

Tuba




2/4 | 1 1 | 1 2 | 3 2 | 1 – |
Making | music | is such | fun
| 2 2 | 1 | 1 – |
If you | w it's | done.
Shepherd's Pipe
Willow Whistle

Flutes

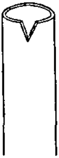
CHAPTER XVII

Flutes

THE word flute comes from the Latin word *flautus,* which means "a blowing" or "breathing." The word is usually applied to any instrument in which the stream of air from the breath, without the help of any other vibrating object, starts the tone in a tube or a pipe of some kind. There are many wind instruments which require more than this. The trumpet requires fluttering lips to help start the tone; the saxophone must have a little piece of thin wood fastened in the mouthpiece, and set to vibrating like a beating tongue before the tone can be started. So neither the trumpet nor the saxophone can be placed in the flute family. The fife, which we sometimes hear in the band, is only a tube with some holes in it, and it needs only the player's breath to start the tone; hence, the fife is a kind of flute. A panpipe may properly be called a primitive flute, for nothing is required but the tube and the breath going over it in a certain way. From the simple panpipe many forms of flute have been developed.

Vertical Flutes: The panpipe is closed at one end, as you remember, but there are other types of flute that are open at both ends. It is much more difficult to produce a musical tone by blowing across the end of

a pipe that is open at both ends, than to produce a tone *in a closed pipe. If you can find a piece of bamboo or a* hollow reed open all the way through, try to make a sound by blowing across it. Cut a little notch in it as shown in Figure 1, and make the edges of the notch thin and sharp. Blow from the other side so that the air comes across the notch. If that will not work, try making the notch square, with edges very thin as shown in Figure 2, and direct the breath so that it strikes this notch and is divided into two streams of air, one going down the tube, the other over it.



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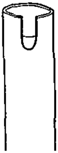

2

The people of primitive races often become very expert in blowing on long open reeds. There are savage tribes that blow them through the nostrils. Figure 3 shows a savage playing a nose flute.

The ancient Egyptians made an instrument called the *Mam,* an open tube blown across one end, and even today the Arabs and Egyptians play upon such an instrument which is called a *Nay,* or *Vertical Flute.* It is called a vertical flute because it is played in the vertical position, while other flutes are played in other positions. The vertical flute was probably first developed in Egypt. Some of the ancient writers say that Osiris, the Egyptian water-god, invented the flute and gave it to his people. Primitive flutes have been found in ancient Egyptian tombs that were built centuries before Christ was born, and many of the paintings on the walls of these tombs show the flute as it was played at that time. In one of the tombs of the Great Pyramid at Gizeh, *which dates from about 2000 B. C., a group of*

3

eight flute-players is shown giving a concert. Figure 4 shows one of these players, and if you turn to page 388 you will see the entire picture.

Figures 6 and 7 show two nays made by an American boy from hollow reeds. Notice the curves cut in the top of the reeds. One curve is to let the reed rest more closely against the lower lip, and the other curve, with a very sharp edge, is to cut the stream of air as the breath is blown against it. The holes which are shown in the lower part of the reed were burned with the end of a wire that was heated red hot. By opening and closing these holes with his fingers, the boy was able to play more than one note on the same pipe. Perhaps you can make a Nay. It is not difficult to make one if you can find a piece of bamboo or other hollow reed.

In Figure 5 is seen a kind of nay or vertical flute made by the natives of Peru. It is an open piece of bamboo with a square sharp-edged notch to blow against, six holes for the fingers in front, and one thumb hole in the back. Its tone is sweet and plaintive.

The device of cutting a little notch or a very thin edge was invented very long ago, for it is found in ancient Chinese pipes. The sharp edge seemed to make the tone come a little easier, but even so it was difficult, and some inventive mind of ancient days discovered a way to improve it. This new idea was to fill the upper end of the tube partially, leaving only a small slit, so that the air could be concentrated in one thin flat stream. A hole with a sharp thin edge was then cut lower down in the tube, and the breath coming through

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6

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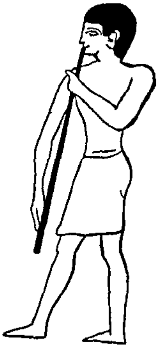

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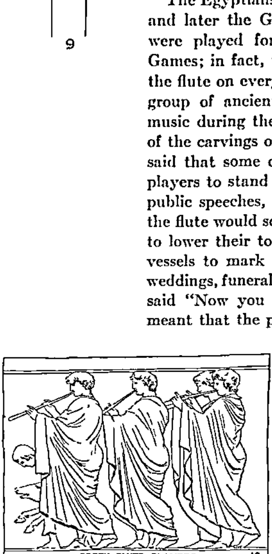
the small slit was thus forced to the proper place, straight against the thin sharp edge that was cut in the tube. This sharp edge cut the thin air stream and started vibrations in the tube, and a musical tone was the result. Even this invention was made ages ago, for it was known to the Greeks and Hindus long before the time of Christ.

8

9

The Fipple Flute: This kind of mouthpiece is now called a "fipple," and such an instrument a fipple flute. In the ancient days it was merely called the "flute." Two views of a fipple mouthpiece are shown in Figures 8 and 9.

The Egyptians probably gave the flute to the Greeks, and later the Greeks gave it to the Romans. Flutes were played for the chariot races in the Olympic Games; in fact, the ancient Greeks and Romans used the flute on every possible occasion. Figure 10 shows a group of ancient Greek flute players furnishing the music during the sacrifice of a wild boar. This is one of the carvings on the Parthenon (see page 204). It is said that some of the Roman orators employed flute players to stand behind them when they were making public speeches, then if their voices became too high, the flute would sound a lower pitch as a signal to them to lower their tones. Flute players were employed on vessels to mark time for the rowers; they played at weddings, funerals, and at death-beds. When the doctor said "Now you may send for the flute players," it meant that the patient was about to die.



GREEK FLUTE PLAYERS 10

The ancient writers have given us the names of some of the great flutists. Olympus, who lived about 630 B. C., was one of them, also Pronomus and Terpander, 680 B. C. Terpander once quelled a tumult by his flute. Pindar, the poet, and King Midas "the Glorious," were renowned flute-players. Once, at a banquet, Alexander the Great became so excited by a war-like tune played on a flute, that he seized his weapons and almost attacked his guests.

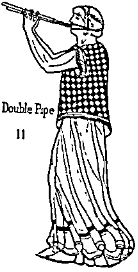
There was a time in Greece when it was considered a disgrace for a gentleman not to be able to play the flute, and professional flute players were paid enormous prices. In those days the expression "He lives as a flute-player lives," meant much the same as our expression of today, "He lives like a millionaire." The Greeks had the long flute called the *Aulos*, a small flute and the double flute. It is thought by many writers, however, that the aulos was not a flute. (See page 294.)

The ancient Egyptians, Assyrians, Greeks and Romans sometimes used two flutes set in one mouthpiece (see Fig. 11). This double-flute was pictured in decorations on walls and vases, which have been preserved through the ages. Figure 12 is from an ancient Assyrian carving on stone. Double-flutes are still used in Greece and by the boatmen of the Nile.

After the days of ancient Greece and Rome, little was heard of the flute in civilized countries. It seems to have been forgotten for several centuries except in a

12

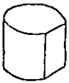
Assyrian Double Flute



Roman Double Pipe

11

few scattered places in the world, where wind instruments were gradually developing from primitive panpipes into more modern forms.

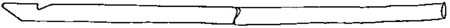


13

The fipple mouthpiece which was probably used in some of these ancient flutes, is the same contrivance which many makers of modern whistles use. If you will examine a metal whistle you will find that there is an outside slit of some kind with a sharp edge, or fipple, which the breath strikes against, as shown in the fipple mouthpiece on page 278. The boy who makes a willow whistle in the spring, uses this invention, by plugging up most of the blowing end and making a sharp slit for the air to strike. Have you made a willow whistle? If not, try it some spring day. Cut a piece of willow several inches long and about the size of your finger. Moisten and tap it to loosen the bark from the wood part, but be careful not to crack the bark. When you can slip the bark off, you will have a hollow tube and a wooden stick that exactly fits it. Cut a piece from one end of the stick, about half an inch in length. In one side of this little round piece, cut off a thin slice (see Fig. 13). Fit it back into the end of the tube, and you will see the little flat channel where the breath goes through.

14

About one-fourth of an inch below the plug, cut a notch in the bark tube, making a sharp edge as in Figure 14, so that the air which comes through the little channel will strike directly against the sharp edge. If you do not get the notch just right so that you can



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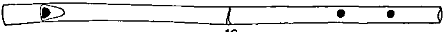


16

blow a tone, cut off the end of the tube, put the plug in the new end, and try it again and again until you get a tone. For convenience in blowing, the end of the whistle is generally slanted as in Figure 15.

If you wish to play more than one note on your whistle, take the wood out entirely, except at the mouthpiece, and leave the bark hollow all the way. With great care cut a hole at a distance of about one-fourth of the tube's length from the outer end. Blow the whistle, then cover the hole with your finger and blow it again. What difference in tone does the hole make? Cut another hole half-way between this hole and the lower end of the pipe. Can you now make three different notes? The lowest tone is made when how many of the holes are closed? Which is the highest note? Can you find out by experiment how to play "Hot Cross Buns" on your willow whistle?

If you can find a stalk of the elderberry plant that has soft pith inside, you can push out the pith and make a whistle of the elder tube.

You can also make an instrument of this kind from a piece of bamboo or other hollow reed. If you do, you will have to whittle a little round wooden plug to fill up the blowing end of the tube; and the rest of the whistle is made in the same way the willow whistle is made. Figures 15 and 16 show such an instrument made of the Japanese fleece flower stem.

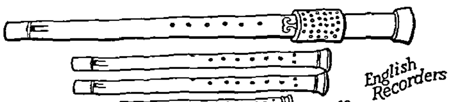
Even simple whistles of this type are sometimes called fipple flutes. In fact, there are many names for

17

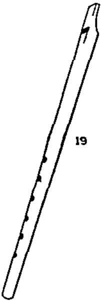
this kind of instrument. Here are a few of its names: (1) Whistle; (2) Fipple Flute; (3) Shepherd's Pipe; (4) Recorder; (5) Flageolet; (6) Bird Pipe; (7) Tabor Pipe. You know where it gets the first two names.

Shepherd's Pipe: The shepherd of ancient days made not only panpipes but also an instrument of one reed with a fipple mouthpiece and holes in the reed to be covered and opened with his fingers. On this he played simple tunes to while away the lonely hours or to keep his sheep together. The simplest of the shepherd's pipes had only two or three holes, but these were all that were needed for the simple three or four-note tunes which the shepherds played. In some countries, even today, the shepherds and goat herders play upon pipes of this kind which they themselves make from bamboo or other reeds that grow near them. In the picture on page 274 a very tiny shepherd can be seen playing such a pipe in the meadow.

Recorder: This is the name which the English people gave to the kind of fipple flute that was developed in England several centuries ago. In those days the word "record" had a meaning much the same as our word "warble," or "to sing as a bird;" so that a "recorder" was a "warbler," and made sounds like the singing of a bird. It is thought that this name was first used about the fourteenth century, and during the fifteenth century the recorder was very popular in England and Scotland. This instrument usually had eight holes, six in front for the three large fingers of each hand, one at



the back for one of the thumbs, and one at the lower end of the side for a little finger. They were made of wood and in several sizes. There were high, medium and low-toned recorders; sometimes there were eight sizes in a set, though usually only four, called discant, alto, tenor and bass. The largest ones were sometimes eight feet long. (Fig. 18).



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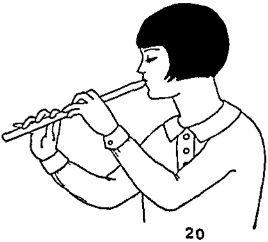
Flageolet: The old name which the French people gave to the fipple flute or English recorder was *Flute-á-bec*, because the mouth piece was shaped so much like the beak of a bird. Later it was called *Flageolet*. The main difference between the French flageolet and the English recorder was in the number and arrangement of the finger holes.

The most common form of the flageolet is the ordinary tin whistle with six holes. It consists of a hollow tube of metal with a fipple mouthpiece at one end. (See Fig. 19.) In playing it, three fingers of each hand are used to cover the holes. Number 1 of the scale is made by covering all the holes at once, and blowing very gently. If any air escapes through a hole, the tone does not come true, so it is necessary to train the fingers to fall firmly over the hole and cover it perfectly. Figure 20 shows the position of the hands in holding the instrument. Number 1 is the hardest note of all, and when that is learned, it is easy to lift one finger at a time for the other notes. One finger (the one farthest from the mouth) is lifted for Number 2, two fingers for Number 3, and so on. Number 7 is made by lifting



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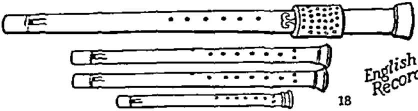


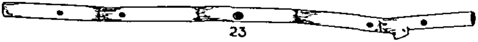
English Recorders

thumbs and fingers enable one to play tunes of several notes' range on this instrument. The position of holding it is shown on page 284. The hole below the mouthpiece must always remain open. When all the other holes are covered the lowest tone of the instrument is made. By lifting one finger at a time the notes of the scale may be produced, and when the scale is learned, simple tunes are easily played. This instrument is very satisfactory to use for imitating bird songs.

The *Transverse Flute:* At some time in the distant past it was discovered that a musical tone could be made by blowing across a hole in the side of a hollow tube. Perhaps some shepherd, blowing across one of the holes in the side of his pipe, made the discovery quite by accident.

The very oldest side-blown instrument of this kind is the ancient *Chinese Tsche,* blown from a hole in the middle of a long tube. This kind of instrument was known also in Japan and in ancient India, but its use was discontinued several centuries ago.

Figure 23 shows a tsche made by a modern school girl from a long hollow stem of the Japanese fleece flower plant. All the joints were pushed out, making it open all the way through. Midway between the two ends, a hole was burned in the side with a red-hot metal rod. This hole was about three-fourths as large as the end of the tube, and its sides were kept very straight. The girl in the picture is blowing across the hole as she would blow across the top of a panpipe.



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all the fingers and having all six holes open. To make Number 8, cover all the holes except the one nearest the mouth. Number 8 may also be made by covering all the holes and blowing a little harder, but a gentle breath with the upper hole open gives a more pleasing tone. All the tones of the flageolet become too harsh if much breath pressure is used.

When you have learned to play the flageolet scale easily, you will have no trouble in playing the simple melodies given in former chapters.

Bird Pipe: The fipple flute in its various forms has been used, not only for imitating birds, but also for training birds to sing certain short melodies, and the instrument is sometimes called a "bird pipe."

The *Tabor Pipe* was a small three-holed pipe popular in the days of Old England. It was held to the mouth with the left hand and fingered by three fingers of that hand, while the right hand beat upon a small drum or "tabor" which was swung over the left arm or shoulder. By this means one musician played two instruments at once, marked the rhythm of the tune he was playing, and perhaps often danced at the same time! (Fig. 21).

The *Ocarina*, which one may buy in almost any music store, is a modern clay instrument, with a fipple mouthpiece. (Fig. 22.) The breath is directed through a thin flat channel to strike against a sharp edge in the clay. The instrument is often called the "Sweet Potato" because it is shaped like that vegetable. Holes for both

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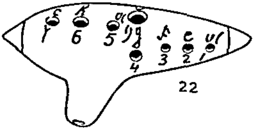

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When she found that she could make a clear tone, she burned a hole in each side and with these two side-holes she could play three-note tunes. You will find a tsche very easy to make from a hollow reed.

The next step in the development of flutes was to blow through a hole placed *near the end* of a tube, and when this plan had been worked out, the modern flute which we hear in orchestras today, was developed. The main difference between an ordinary flute and a tsche is the placing of the blow-hole or *embouchure* as it is called. In the flute, the embouchure is near one end and takes the place of the hole at that end of the pipe, which is accordingly plugged up. All the finger holes are placed toward the other end.

The idea of this "cross-wise" or "transverse flute," probably came to Europe from Asia, where it was used in ancient days by Chinese and Hindus in the form of the tsche. It probably appeared in Europe about the twelfth century, and in the thirteenth century it was very popular with the "Minnesingers," or lyric poets and singers of Germany, and it was widely known as the *German Flute.* Figure 24 shows a picture of an early German Flute. Later came the development of keys to cover the holes and enable them to be opened by pressing the end of a little lever. In this way more than six holes could be managed. (See Figs. 25, 26.)

The greatest flute maker the world has yet known was Theobald Boehm, born at Munich in 1794, the

son of a working jeweler and goldsmith. When he was ten, he made himself a four-keyed flute. Later he improved the flute by covering all the holes with pads, to be lifted by the fingers, and he adjusted them so that the fingers could easily manipulate all the keys. Finally, after many improvements, he perfected the flute which is used in our orchestras today and is still called the *Boehm Flute.* (Fig. 27.) Formerly these flutes were made of wood and had metal keys; but in recent years many of the Boehm Flutes are made of silver. (Fig. 28.)

The *Piccolo* is a small flute usually less than half the size of the ordinary flute. Its tones are much higher than those of the flute, and in orchestra music it is only used occasionally, for the ear soon tires of its piercing, high tones. (Fig. 29.)


29

A *Fife* is really a small cylinder flute, generally unjointed, with six finger holes and no keys. It was first introduced into military music early in the sixteenth century by the Swiss who soon spread the instrument all over Europe. It was at that time known as the "*Swiss Pipe.*" (Fig. 30.) Drummers and fifers were employed in the English king's band as early as 1530.


30

Home-made Flutes: If you find a long, straight, hollow reed, or a piece of bamboo from twenty to thirty inches long, *you can easily make a flute.*

(1) See that all the joints are pushed out, with a smooth opening all the way through. If you can get


27


28

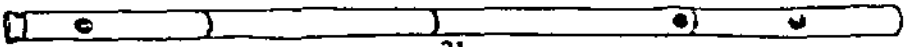
all the other joints cut out without removing the joint at one end, do so; but this is not necessary for you can easily plug up one end with a cork. (Fig. 31.)

(2) At a distance of about one diameter of the tube from the cork, or joint, bore or burn a hole through the side of the reed. Let the hole be shaped as in Figure 32, and make it only a little smaller across than the diameter of the tube. This is the embouchure. See that the walls of the hole are smooth and straight. The edges must not be sharp as in the fipple flute.

(3) Blow across it and see if you can make a tone. In order to get the flute placed properly, put it to the lips so that the hole comes exactly to the center of the lips. Then roll it over until only one side of the hole is against the lips. Now direct a thin stream of air across the hole, so that it will strike the opposite edge. Continue to experiment until a tone comes. If there is no leak in the cork end, and if the hole is in the right place, a tone will come in time. This is the lowest note, the "fundamental note" of the tube.

(4) About one-eighth of the tube's length from the outer end bore or burn a straight round hole through the wall of the tube (see Fig. 31).

Open and close this hole as you play and see if the tone, when the hole is open, is Number 2 of the scale. If the note is too high, you may fill the hole with wax or paraffin, and bore another hole lower down. If the note is too low you may enlarge the hole upward. If that does not make it high enough, plug it up with wax and burn another hole.



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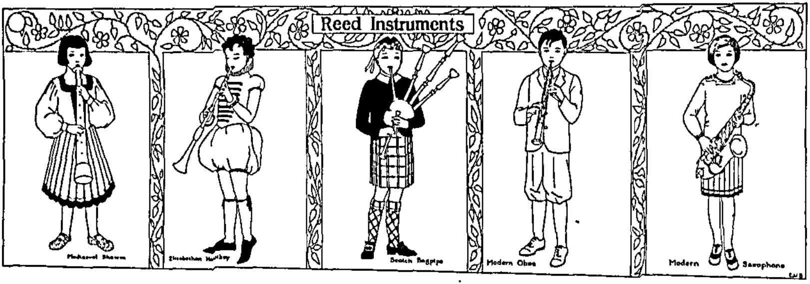
(5) When the hole for Number 2 is placed right, make a hole for Number 3, leaving almost as much space between the holes as there is below the first hole.

When you have two holes properly placed, you may play three-note tunes. The big girl in the center of page 274 is playing a two-holed flute and so is the boy on page 288. Other holes may be added but, as a rule, three or four holes are all you will need on these simple flutes, at least until you have learned to play them well. There are many good three, four and five-note tunes which are suited to them. Some of these may be found in Chapters IV and V.

Anyone who has made a good bamboo flute and can play it, will have little or no trouble in learning to play a regular orchestral flute. The picture below shows a modern silver flute and the position of the hands in playing it.


Reed Instruments
Mediaeval Shawm
Elizabethan Hautboy
Scotch Bagpipe
Modern Oboe
Modern Saxophone

CHAPTER XVIII

Reed Instruments

THERE are three ways in which wind may be used to produce tone, and according to these three ways, wind instruments are divided into three great classes:

1. *Flutes*—in which a stream of air passing over the end of a tube, or over a hole in a tube, starts the tone.

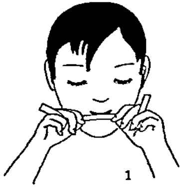
2. *Horns*—in which the lips vibrate as the breath comes through them.

3. *Reed Instruments*—in which thin strips of reed are made to vibrate, to start the tone.

The flutes and horns have been discussed already. This chapter will deal with the third great division of wind instruments, in which the breath starts certain objects to fluttering in order to make a tone. These are called "reed instruments" because the little vibrating strip in the mouthpiece is usually made of cane or other kind of reed. You will see that the word "reed" has two meanings—(1) a hollow stalk of tall grass; and (2) the little strip of thinly sliced bamboo which vibrates in certain instruments. The instruments take the name of this little strip, and are called "reed instruments."

An experiment: Cut a very narrow strip of strong paper about two inches long. Hold it tightly across the lips (see Figure 1) and blow across the edge of it

until you hear a high "squeaky" tone. Try the same thing with a blade of grass held firmly in your hands. This shows you something of the way reed instruments work. When a strip is held at both ends and made to flutter in the middle, as in the case of the grass and strip of paper, it is called a *ribbon reed.* Although ribbon reeds are easy to blow, the tone is not very musical, and one does not often see a ribbon reed instrument for real tune playing. They are common in toy instruments.



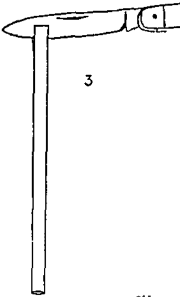
1

The Indians sometimes cut a narrow strip from a thin layer of the bark of a red cedar, stretch it tightly across a narrow air passage, and blow it for various signals. The Navaho Indians make a ribbon reed instrument to imitate the cry of the eagle in their "Eagle-Chant." It is made from the leg bone of a jack-rabbit which has been killed by an eagle. The bone is split and the marrow removed, after which a piece of the skin of the jack-rabbit's ear is laid between the two pieces of bone, and they are bound together with sinew.

Double Reeds: The American Indians have developed several varieties of reed instruments, but most of their "reeds" are just ordinary wood trimmed very thin. A very common one consists of two thin pieces of wood which beat together at the blowing end of the tube. These thin pieces rapidly vibrate, coming together and apart in quick succession as the breath goes through the opening between them, and this starts the tone. These are called "double reeds," or "double-beating reeds," because they beat together.

2

Have you ever made a musical tone by blowing through the hollow stem of a squash leaf? If not, try it the next time you have squash plants growing in the garden. The stem of the leaf is long and hollow. Trim away the leaf, but in cutting it away, do not cut off the end of the hollow stem. Near this small end, cut with a knife, a small lengthwise slit about an inch long. Insert about two inches of the stem in the mouth and blow. If you make the breath go through it in the right way the two sides of the slit, beating rapidly together, produce a tone. Cut two holes near the big end of the stem, and see if you can play "Hot Cross Buns." This squash leaf stem is a very simple kind of double-reed instrument. (Fig. 2 and the picture below.)



3

Another simple double-reed instrument may be made from a large wheat straw, or a drinking straw from the soda fountain. First, press the sides together at one end, and split the straw with a sharp knife to a depth of about one-fourth inch. (See Fig. 3.) Insert this split, flattened end in the mouth so that at least one-half inch of the straw is inside the mouth. Blow the breath through it so that the two flat ends can vibrate. Do not touch the tongue to the straw while blowing. You will probably hear a rather soft whirring sound, something between a buzz and a squeak.

If you burn a small hole or two in the lower end of the straw with a red hot wire or needle, you may be able to make two or three different tones. This straw

instrument is not very musical but it makes a good illustration of the working of a very important instrument of the orchestra, the *Oboe.*

Your straw oboe represents a very ancient ancestor of two or three modern orchestral instruments. It is quite probable that shepherds of many ages ago discovered how to make sounds with a hollow blade of dry grass, and amused themselves with it as they lazily looked after their sheep.

4

After discovering how the two sides of a straw can be made to vibrate and start a tone, someone improved upon the straw instrument by using only enough straw for the mouthpiece, and fitting this flattened end of straw, called "the reed," into a larger and longer tube. The small vibrating reed which is held inside the mouth, naturally wears out more quickly than the tube, and the reeds have to be changed frequently.

No one knows how old is this "double-reed" type of instrument. It is thought that the ancient Egyptian had instruments of this kind, for in some of the tombs pipes have been found with straw beside them as if meant to make mouthpieces of this kind. Holes in the pipes enabled the player to make different tones.

This type of instrument was known to the Greeks, and it is believed by many that the Greek *Aulos* was an instrument with a double-reed mouthpiece. It is possible that most of the Greek "flutes" were not flutes at all, but reed instruments.

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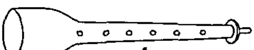

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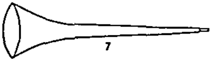

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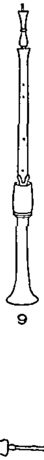
Certainly the Romans used reed-instruments, an example of which is the *Tibia*. Double-reeds were very popular with the Romans who, like the Greeks, used their wind instruments on both festive and solemn occasions. The tibia appears to have been of two kinds —right and left-handed, and it is possible that the same type of instrument was used as the "double-flute" (see Figs. 4 and 5).

The Romans probably brought the Tibia to England when they conquered that country, and some kind of reed pipe has been known in England ever since those ancient times.

In carvings of the twelfth century there are figures of a cone-shaped reed pipe which is called the *Shawm*. Even in the days of the Greeks it had been discovered that a reed instrument sounded better if the tube was made slightly cone-shaped, and the expanding bell at the end gradually came to be the accepted form. There *are many more illustrations of the shawm in fourteenth* century carvings and manuscripts, for by this time it had begun to take a place in the wind bands of England. Figures 6 and 7 show some of these early shawms.

The shawm was usually made of wood; and its tones were high, and there came a time when its name was changed to *Haut-bois* or *Hautboy*, which means "high wood." Figures 8, 9, 10, 11 and 12 show various kinds of hautboy.

8



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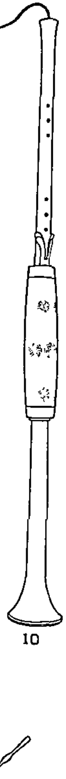

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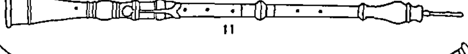

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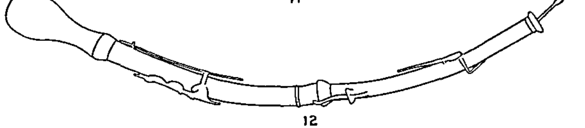

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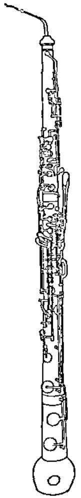
OBOE



ENGLISH HORN

The modern *Oboe* is merely the perfected form of the old English hautboy and the name is also a shortening of that word. It is still a slightly conical tube with a bell-shaped end, and a double-reed mouthpiece. Holes in the tube and keys to manipulate them, enable the player to make any interval within its range of more than two octaves.

The so-called *English Horn* of the orchestra is not a horn at all, but merely a large and low-pitched Oboe. *Its range is five notes lower than that of the Oboe and* its length is correspondingly greater. The bell-end of the English horn takes the shape of a bulb. The greater length and the bulb are the only two ways an observer can tell the difference between the Oboe and the English Horn.

The bass instrument of the double-reed family is the *Bassoon*. Its tube is about nine feet long doubled up on itself for convenience in handling. It has a remarkable range of three and a half octaves, and its tone is rich and full. The *Contra-bassoon* is even longer, and is used only in large orchestras.

Figures 13 and 14, show the kind of mouth-piece that is used in all orchestral instruments of the double-reed family. They differ only in size.

The Single Reed: Instead of two reeds beating against each other, some instruments have only one reed beating against the slanting side of the tube to start the tone.

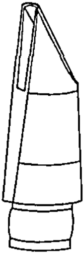
13

14

The Indians of the Northwest sometimes make an instrument with one reed beating against the side of a hollow bone. They remove the marrow from the leg bone of an Eagle, and then cut down on one side of the end to form a slanting surface. Against this slanting surface is laid a thin flat slip of wood, bound in place with a sinew. The entire end of the bone is placed in the mouth and the force of the breath through the opening causes the reed to beat rapidly against the hollow bone. This beating starts a tone. The Indians make single-reed pipes from long blocks of wood also, by hollowing them out and using a thin slip of wood, or sometimes a thin strip of tin for the reed. These primitive single-reed instruments, like the primitive double-reeds, are not very musical in tone. It is only by gradual development and refinement that reed instruments have been made musical enough for orchestral use.

The best known single-reed instrument of the orchestra is the *Clarinet*. Its mouthpiece is made on exactly the same principle as that of the Indian bone instrument just described, but there are many stages that come between the two in the clarinet's development. Figures 15, 16, 17 and 18 show the kind of reed and mouthpiece used in instruments of the single-reed type.

A wheat straw may be used to illustrate the principle of the single-reed instrument. In a closed end of the straw cut a little tongue about an inch long, and put



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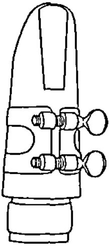

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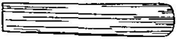

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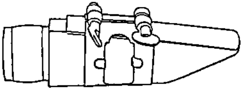

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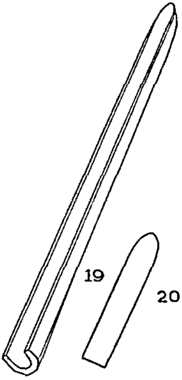
the entire end of the straw, tongue and all into the mouth, and blow.



Indian Squaller

A primitive clarinet, called an "Indian squaller," may be easily made in the following manner:

(1) Scoop out a long, slender trough of wood, with one end open, and the other end closed, the trough gradually slanting up to nothing at the closed end as shown in Figure 19.

(2) Round off the closed end by trimming the wood away. (Fig. 19.)

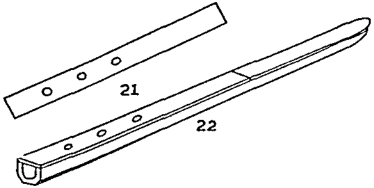
(3) Make a thin "reed" of wood, thin as paper at one end, but thicker at the other end. (Fig. 20.) Trim it to fit the rounded end of the trough when it lies flat upon it, the thin part against the end. (Fig. 22.)

(4) Hold the reed in place with your finger, two or three inches from the rounded end and put the rounded end, reed and trough together in your mouth, an inch or more inside, and blow. The reed should be on top, and the lower teeth may touch the trough. If the reed is thin enough at the edge, and fits the trough properly, you will be able to make a loud "squawking" sound.

(5) Place a thin piece of wood over the remaining part of the trough, and fasten it tightly in place with glue or string. This piece should fit closely against the lower end of the reed.

(6) If you wish to make more than one note, you may bore holes in the thin trough cover. (Fig. 21.)

(7) Figure 22 shows the three parts of the squaller

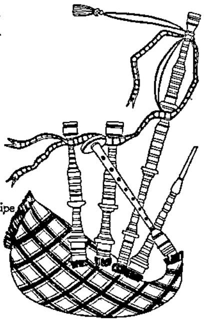


placed together. The lower piece has been glued to the trough and to the lower end of the reed, but the rounded end of the reed must be left free to vibrate.

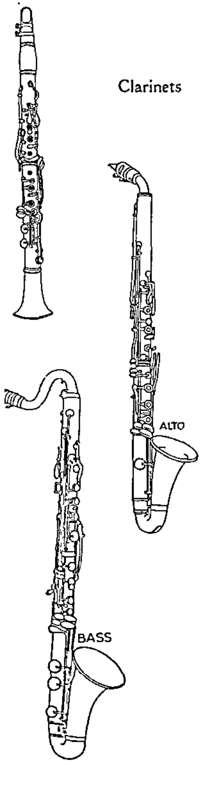
Fasten a piece of adhesive tape around the joint, so that no air will escape between the two pieces that cover the trough. These two pieces, reed and finger-board, may be made in one piece if you prefer.

The single-beating reed, as it is sometimes called, was the invention of many centuries ago. It is found in Egyptian and Roman pipes, and in the old Keltic *horn-pipe,* and is still found in many forms of the modern "bag-pipe."

The *Bag-pipe* is a well known instrument of past centuries which was very popular in Europe in the Middle Ages, and still flourishes in some countries, especially in Great Britain. It consists of pipes attached to a leathern bag which is filled with wind, either by the player's mouth or from a bellows worked by the player's arm. A common type has four or five pipes; one of these is a melody pipe called the "chanter," somewhat similar to the shawm, with a double-reed mouthpiece and several finger-holes; the others are "drone" pipes, with no finger-holes and a single reed inserted in the end which receives the wind from the bag. The bag-pipe may thus be said to be both a double and single-reed instrument. The drone pipes sound continuously as an accompaniment to the tune played on the melody pipe, and furnish a never-to-be-forgotten character to bagpipe music.



Bagpipe



Clarinets

The *Clarinet* of the modern orchestra consists of a long wooden tube of "cylindrical bore," (which means that it is straight like a cylinder) a single-beating reed at one end, and a bell-like flare at the other end. Six of its holes are lifted by means of keys placed within reach of the fingers. It comprises four "registers," that is to say, different ways of producing higher and higher notes. These registers may be joined by a skillful performer without a noticeable break. Because of the large range of notes made possible by these four registers, the variety of tone color and the ease of swelling and diminishing its tones, the clarinet is generally considered the most useful as well as the most beautiful of all the wind instruments.

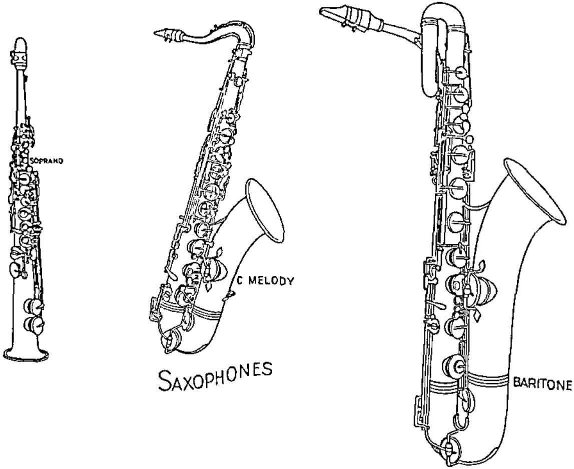
The *Bass Clarinet* is pitched an octave lower than the ordinary or soprano clarinet. Being so much longer, its makers have given it the form shown in the picture, merely for convenience in playing. It has rich, organ-like tones which form excellent basses for the other wind instruments of the orchestra.

The *Alto Clarinet* comes between the bass and soprano clarinets in length and register.

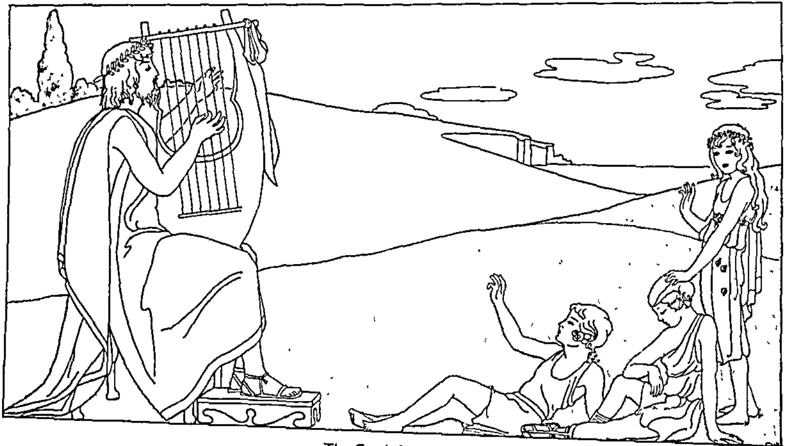
The *Saxophone* was invented in the year 1840 by a famous Belgian inventor and instrument maker, Adolph Sax, from whom it derives its name. As stated above, the clarinet has a tube of cylindrical bore, which means that the diameter is the same all through its length. The saxophone has a conical bore, that is, the diameter

gradually increases all the way to the end. The pictures below show this very distinctly. The mouthpiece is like that of the clarinet, *with a single-beating* reed. Thus the saxophone is a combination of two important features of the clarinet and oboe families; the single reed of the clarinet and the tapering bore of the oboe. It is usually made of brass and is frequently silver plated. There are several sizes of saxophones, and each has a range of over two octaves. They are seldom used in the large, full orchestra, but fill an important place in many dance orchestras, military and other bands.

The reed instruments described in this chapter, together with the flute and piccolo, are called the *Wood-wind Instruments* of the orchestra.



SAXOPHONES



The Greek Lyre

CHAPTER XIX

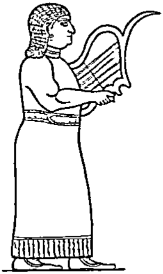
The Greek Lyre

THE *Lyre* is an instrument consisting of some kind of frame with strings stretched across it, and the musical sounds are made by plucking the strings to make them vibrate. If you have ever stretched rubber bands across an open box, you have made a primitive kind of lyre.

The pictures we see of ancient lyres show that in most examples it was a hollow body or "sound box" with two upright arms fastened to the sides of the body, and a cross-bar connecting the two arms near the top. The strings were fastened to this cross-bar and to another bar near the bottom of the sound box. The strings, which varied in number from four to ten, were all of the same length. They produced different tones because they were of different sizes, and were stretched to different degrees of tightness.

Instruments of this kind have been used in various countries of the world, but so much has been written about the lyres of Ancient Greece that we usually think of that country when the lyre is mentioned. We seldom hear of its being used in these days, but it seems to have been the most important musical instrument in the lives and education of the Greeks, and no other people developed the lyre to such a point

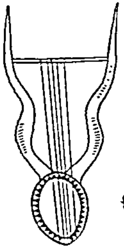
of excellence. Since it played so important a part in their history, it was only natural that the lyre should be woven into many of the myths, or miraculous stories, told of the Greek gods and goddesses.



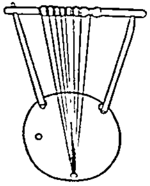
Assyrian Lyre

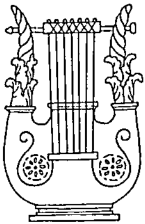
In reality, the Greeks derived the lyre from Asia, but Greek mythology claims that the first lyre was invented by Mercury, the messenger of the gods, and the son of the great god Jupiter. According to the myth, when Mercury was only one day old, he escaped from his mother, and found lying on the ground a tortoise shell which was empty, except for a few sinews of tortoise flesh that had become dry and hard in the sun, and were left stretched across the shell. When he struck his foot against the shell, the dried skin vibrated and made an interesting sound—one that had not been heard in the world before. This gave Mercury an idea. Being the son of the great god Jupiter, of course he had marvelous power, so he took the shell home, bored holes in its sides, stretched strings across it, and thus came into being the first lyre ever made.

Mercury seems to have been a mischievous infant. Later in the evening the young god drove some cattle belonging to the god Apollo into a secluded spot, and killed and ate two of them. Then to appease the anger of Apollo, Mercury had to give him the newly made lyre. Apollo became an expert performer on this instrument, and many of the statues of ancient Greece show him as the god of music, holding the lyre in his hands. He is said to have had one made of pure gold.

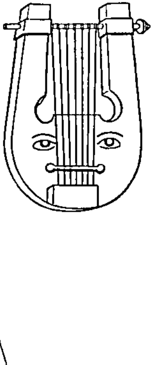


PRIMITIVE LYRES



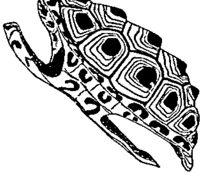


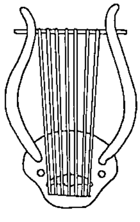
One day a young shepherd named Marsyas found a flute which the goddess Minerva had thrown away, because she thought it spoiled the beauty of her face to blow it. Marsyas very quickly learned to play his newly found treasure, and soon became so conceited that he boasted he could make music as beautiful as that of Apollo, and challenged Apollo to a musical contest. Apollo accepted the challenge and called upon the nine muses to be the judges. Marsyas charmed the muses with his flute-playing; but when Apollo played upon his golden lyre, and sang as he played, his music was so beautiful that he was at once hailed as the winner. According to a previous agreement between the two the victorious Apollo flayed alive the vain Marsyas. When the mountain nymphs heard of the sad death of the shepherd, they wept such torrents of tears that a new river was formed which was called the Marsyas River!



But Marsyas was not the only musician who challenged Apollo to a musical contest. At another time it was Pan who challenged him; and King Midas, who was partial to Pan's music, determined to be the one to award the prize. He gave it to his favorite, Pan, and Apollo was so angry that the beautiful tones of his lyre had not been appreciated, he caused large asses' ears to grow on either side of King Midas' head!

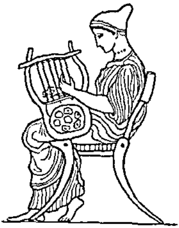
Orpheus, the son of Apollo, is another character of ancient mythology who was famous for his playing on the lyre. It was said that when he played the beasts of





the forests would surround him in amazement, and that even trees and rocks were moved by his playing. The story of how Orpheus almost won back his beautiful wife, Euridice, from the dark realm of Hades by his wondrous lyre-playing is a well known myth. As the story goes, Euridice died, and her spirit was conducted to the realm of Hades beneath the earth. Orpheus, broken hearted, hastened to Jupiter who gave him permission to go down to Hades and try to persuade its king, Pluto, to let him have his wife back. Orpheus knew that it was a perilous undertaking, but he was not daunted, and armed with his lyre, he started out. At the entrance of Hades, Orpheus encountered the fierce three-headed dog named Cerberus, who guarded the gate and would allow no living being to enter, and no spirit to pass out. Orpheus softened the fierce and growling Cerberus by playing on his lyre, and was thus allowed to pass through, where no living being had ever been. Then he wandered on through the dark region of Hades until he came to the throne of Pluto, and standing before him, Orpheus played such entrancing music that Pluto and his queen were melted to tears. They consented to allow Orpheus to take Euridice back to the upper world with him, but only on one condition: he was not to look at his wife's face until they were out of Hades. Orpheus consented joyfully, and they started on their way to earth again. But the further they went, the more anxious Orpheus was to see if Euridice had changed, and finally, just before they reached the gate, he could bear it no longer and

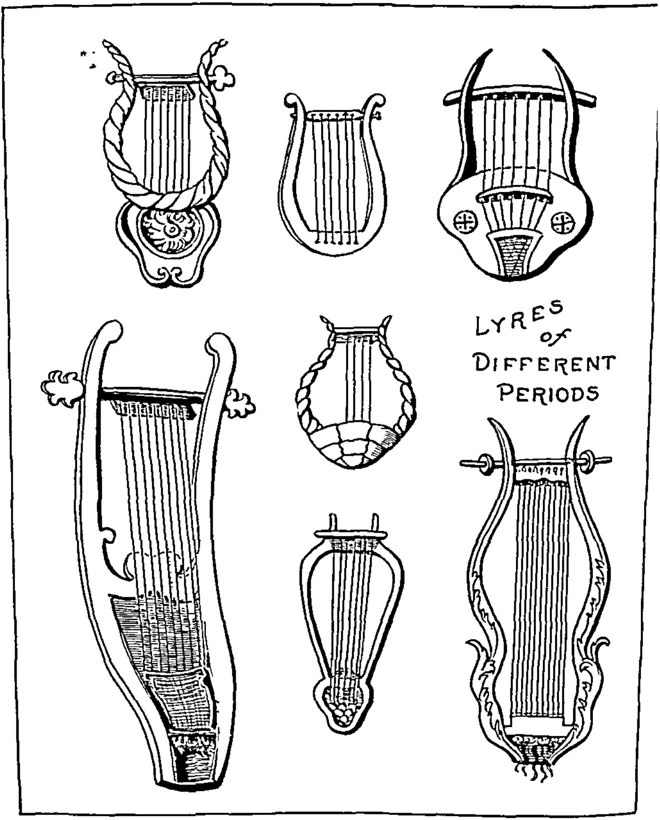
looked back. But he only saw Euridice's vanishing form! Ever after that, Orpheus, broken hearted, lived in the forest solitudes, and the mournful music of his lyre filled with sadness every living being that heard it.



Once Mercury gave a lyre to Amphion, King of Thebes, and taught him to play it. Amphion learned to play so marvelously well that he, too, could tame animals and move trees and stones by his music. It is said that when he wished to build a wall around his city, he played his lyre until the stones rolled themselves into place, and the wall was finished entirely by the sound of his lyre!

Many of the Greek legends refer to the taming of wild animals by music, and it is evident that they believed in the power of music to sway the moods of animals as well as men. Thus when a Greek artist of long ago wished to picture the idea that love can soften even the fiercest and most cruel nature, he did so by carving a figure of the little god of love taming a lion with the music of his lyre. (See picture below.)

Of all musical instruments, the lyre was the most popular one among the Greeks, and the one most highly honored by them. It was the instrument used by their poets who, like the "bards" and "minstrels" of later days, were expected to sing or chant their poems to a musical accompaniment. Thus the Greek poet was at the same time a musician, and in those long-ago days, when books were rare things, he was also the chief story teller and historian of the time. The famous tales of the Greek heroes, and all the


LYRES of DIFFERENT PERIODS

curious myths of the Greek gods and goddesses were originally told and sung from memory to the accompaniment of the lyre. In this way they were handed down for many generations before anyone came to write them in books. Today when we read these famous legends, it is interesting to remember how the Greek children of long ago must have heard them—in some such way as the picture on page 302 suggests, under the warm skies of that wonderful land, and to the music of the lyre.

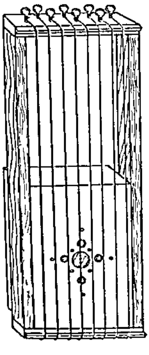
The early lyres probably had no more than four strings, but gradually the construction of the instrument was improved, and more strings were added. The illustrations in this chapter show various forms of the Greek lyre that have been preserved for us in statuary and in decorations on Greek vases. None of the ancient instruments have been preserved, but we know from modern imitations of the Greek lyre that the tone must have been very sweet and musical. It is not surprising that the Greeks should have given it such a place of honor, and that all children who went to school should have learned to play the lyre. The picture below is a drawing from an old vase showing a boy and his teacher at a music lesson.

If you examine the drawings of the Greek lyres, you will see that they all consist of some kind of frame made to hold several stretched strings, and usually there is a box-like part at one end of the frame. This box is a kind of resonator, to make the tone of the

strings louder. You will see the need of a resonating box if you will stretch a string tightly in the air and pluck it, and then stretch it tightly over something with a deep, hollow cavity, and pluck it again. There will probably be a great difference in the two sounds.

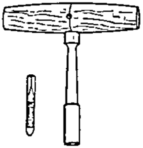
The *Cigar-box Lyre.* Figure 1 shows a form of lyre which you may make if you can find a cigar-box and some wood to make a strong frame around it. This frame must be strong enough to hold strings when they are pulled very tight.

There are three things about a string that affect the pitch of its tone: (1) its length; (2) its weight, and (3) the tightness, or tension, to which it is drawn. Thus the pitch can be regulated by changing the length, or the weight, or the tightness of the string. In a lyre the length is the same for all the strings, therefore the different tones of the scale must be obtained by having strings of different degrees of heaviness, and by stretching some of them tighter than others. If you are going to have eight strings to your lyre, you should have at least four different sizes of string, the heaviest ones for the lowest notes, and the light ones for the high notes. If they are arranged in pairs, the two heaviest at one side, two that are next in weight coming next, and so on, you can probably tune them to the eight-note scale, but one string in each pair will be stretched a little tighter than the other. In this way you regulate the pitch of the strings by both weight and tension.



Materials. For making a cigar-box lyre, these are the materials required:

a cigar-box;
about three feet of strong wood, $\frac{3}{4}$x$1\frac{1}{2}$ inches;
eight strings, graduated sizes, either wire or cat-gut;
eight metal pegs, unless you prefer to make your own pegs of wood;
two slender strips for bridges;
eight small, round-head screws;
four long, flat-head screws;
a few long, slender nails, and some very small brads;
glue; and stain, if you wish to stain the instrument;
a "tuner" or key to turn the pegs, if you buy the ready-made metal pegs.

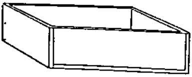


The strings, metal pegs, and the tuner will have to be bought at a musical instrument store.

Tools. You will need the following tools: a saw, hammer, a coping-saw, screw-driver, a brace and $\frac{9}{32}$ inch bit (for wooden pegs) or $\frac{9}{32}$ inch bit (for metal pegs), and, if you use wire strings, a wire-cutter and a pair of pliers.

Procedure. (1) First, clean all paper from the cigar-box and from the lid. Hot water will help to loosen the paper so that it can be scraped off, but do not let the wood soak in water. Let it dry thoroughly.

(2) Put the lid aside to be used later. Tighten the joints of the box with small brads, and use glue to close up any cracks that may appear when you hold the box up to the light. (Fig. 2.)



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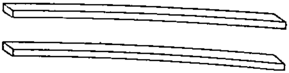

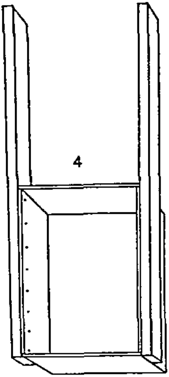

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(3) Cut two strips of wood eighteen inches long for the sides of your frame. (Fig. 3.)

(4) With small brads driven from inside the box, fasten these strips to the sides of the box exactly even with its lower end. The front edge of the frame must also be even with the top of the box when the lid is on. If the body of the box juts out beyond the frame in the back, it is all right, but all the surfaces must be even in front. (Fig. 4.)

(5) Cut a strip for the bottom of the frame long enough to reach the outer edge of each side strip. Into the lower side of this piece of wood drive eight small screws, almost up to the head of each screw. The strings are to be tied to these screws. (Fig. 5.)

(6) Fasten this strip across the bottom of the frame, using a long screw and two long, slender nails at each corner. These joints must be very strong for there will be great strain on them. (Fig. 6.)

(7) With tiny brads driven through the box, nail the end of the box to the bottom of the frame. (Fig. 7.)

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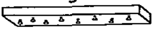
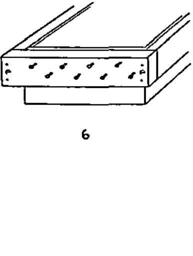


(8) Cut another piece of wood the same length as the bottom strip to be fastened across the top of the two sides. This strip is for the pegs. (Fig. 8.)

(9) It will be better to bore holes for the pegs before the strip is nailed in place. Leaving an inch or more at each end, bore eight holes entirely through the wood with the brace and bit, arranging them in two zigzag rows as shown in Figure 9. This arrangement is to give room for the tuner to be used on the pegs.



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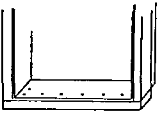

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(10) Fasten this piece across the top, using a long screw and two long nails in each corner. Now the frame is made. (Fig. 10.)

(11) The lid of the box must have a hole or holes in it to allow the sound to go into the box and be intensified. Make your own design for this opening and cut it out with a coping-saw, being very careful not to split the wood. If it should split, go ahead and finish your design and glue the parts together afterwards. A very narrow strip of paper can be glued over the seam on the under side, where it will not be seen. If you prefer, a cluster of holes may be bored in the center of the lid, using a brace and large bit. (See Fig. 11.)

(12) Glue the lid to the box in its original position, using a few very small brads to be sure that it will not fall off later. (Fig. 12.)

(13) Prepare two slender strips about ¼ inch thick and as long as your instrument is wide, with a sharp edge along the top of each. These pieces are "bridges" to be slipped under the strings at bottom and top of the lyre, to keep the strings from rattling against the box when they are plucked. (Fig. 13.)

(14) Stain your instrument. Most people think that stain is better than varnish for lyres, and it is certainly better than paint.

(15) When the instrument is dry, it is ready for the pegs and strings. First screw the pegs into the holes, leaving about ½ or ¾ inch of each peg standing above the wood. If metal pegs are used screw them into the

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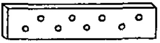

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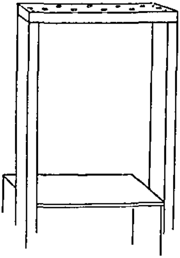

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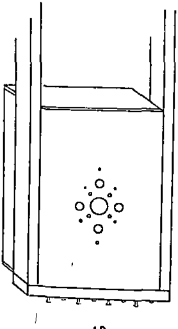

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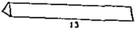

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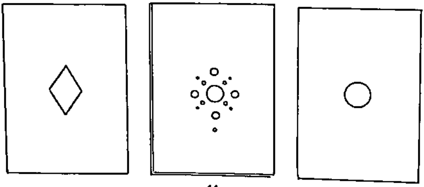

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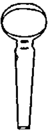
wood with a metal peg tuner. Examine the "threads" on the pegs to find out in which direction you must turn them. Wooden pegs (Fig. 14) may be pushed into the holes and turned by hand. Do not drive the pegs in with a hammer. They must *turn* into the wood, following the threads made around them. (Fig. 15.)



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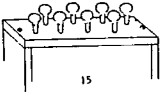

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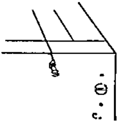
(16) Take your smallest wire string and make a small loop in one end. (Fig. *a.*) Hold the loop with a pair of pliers and with your thumb and fingers turn the short end of the loop tightly, around and around the wire, coiling it closely as thread is coiled on a spool. It will then look like Figure *b.* After five or six coils are made, cut off the remaining short end with wire cutters. Slip the loop over the screw at the right side of the instrument as it faces you. (Fig. *c.*) Draw the string up to the first peg on the right and pull it through the hole in the peg. (Fig. *d.*) Pull it tightly around the peg and into the hole again. Use the pliers to pull the string very tightly around the peg and through the hole a third time. Now draw the remaining wire up close to the peg and cut it off. Three times around the peg through the hole will be enough to hold it firmly when the string is tuned. Arrange the strings according to size, the smallest at the right and the largest at the left of the instrument as it faces you. (See Fig. 1.)

(17) When the strings are all on, slip the two bridges under the strings and let them rest on the cross pieces, one at the top and one at the bottom. Find by experiment where they best support the strings.

(18) Tune the eight strings to the eight notes of the



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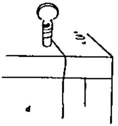

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major scale. Be sure that you find out which way the peg should be turned in order to tighten the string. Do not pull the strings too tight, lest they break. It is perhaps best to tune the smallest wire first. When that string is of the tightness which gives a good tone and yet does not strain the wire too much, let that note be your Number 8, and tune the other wires to suit it.

Perhaps the most comfortable position for holding the lyre is that shown in the picture below. Pluck the strings with the fingers of your right hand unless you happen to be left-handed. The thumb probably makes the best tone, if it does not pull the string with too much force. Pluck the string lightly, and leave it free to vibrate.

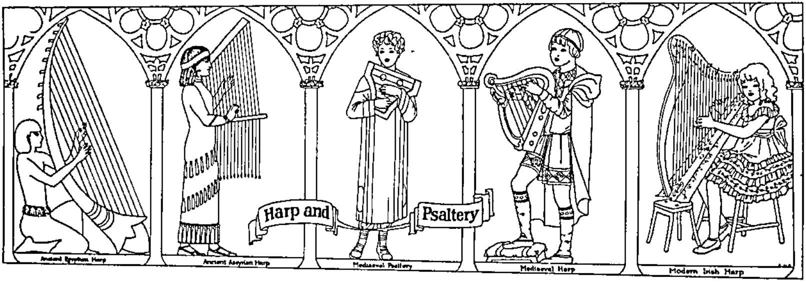
When your instrument is in tune, you will be able to play on it any of the eight-note tunes you have already learned. On the next two pages are some eight-note tunes written in staff notation. If you have read Chapter XIII carefully, you will be able to read notes from the staff to play on your lyre, or on any other instrument which you understand. Your lyre does not need to be tuned to the same key in which the piece is written, unless it just happens to be suited to the strings. If you know which staff note is Number 1, you can play the notes just as if they were written in numbers, for of course you know the numbers of your lyre strings. In the first tune the number notation is also given as a little help; but after that, only the staff notation is given. The key signature will tell you which note is Number 1.

German Folk Tune

The Tree In The Wood

English Folk Melody

Home, Sweet Home


Harp and
Psaltery
Ancient Egyptian Harp
Ancient Assyrian Harp
Mediaeval Psaltery
Mediaeval Harp
Modern Irish Harp

CHAPTER XX

Harp and Psaltery

WHILE the Greeks were developing the lyre, the Egyptians who lived on the other side of the Mediterranean Sea were making use of a more complicated instrument called the *Harp.* Compare the pictures of the harp in this chapter with those of the lyre in Chapter XIX, and see if you can tell what is the main difference between the two instruments. Have you ever seen a harp, or heard the tone of one? It is used in most of the large orchestras, and in some of the smaller combinations of instruments. Sometimes one may hear a harpist who plays solo compositions, but the harp is not very common in this country. In some countries it has been very popular and it is perhaps the oldest type of stringed instrument in use today.

If we look for the beginnings of the harp, we may find that it started in remote ages with the one-stringed hunter's bow which gave a twang as the hunter released the arrow. Some hunter may have added two or perhaps three strings to his strong, curved bow after he had discovered the musical possibilities of a bow-string, and it is quite probable that this was the beginning of the harp, though in reality, no one knows. The ancient Greeks had a story that Apollo heard the twang of his sister Diana's bow-string, and conceived the

2

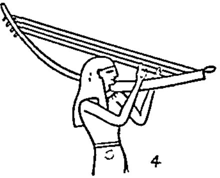
3

idea of converting this dangerous weapon into an instrument of music. Many of the harps shown in the carvings of the Ancient Egyptians have this bow shape. (Figs. 2, 3 and 4.) By and by the bow became more curved, more strings were added, and harps of the shape of Figures 5, 6 and 7 were made. Angular harps also came into use. These were made by two straight pieces of wood fastened together at a right angle, with strings stretched across the angle. (Figs. 10, 11, 12.)

Among the ancient Egyptians, the harp was the most important of all instruments. They developed it in many interesting forms, and brought it to a higher state of perfection than it attained in any other ancient civilization. The figures on this page and the next show various forms of the harp that were carved in stone on ancient tombs of the Egyptian Pharaohs.

Strings stretched across a simple curved bow do not produce a sound loud enough to be heard very far away; but the Egyptians discovered that if some part of the curved bow could be made hollow, to serve as a resonator for the sound of the plucked strings, the volume of the tone would be greatly increased. The *Shoulder-harp* shown in Figure 4 has a boat-like basin on one end of the bow, as a resonator. Other harps pictured in this chapter show different ways by which a resonating part has been added to the instrument.

Some of the harps of Egypt were very large and



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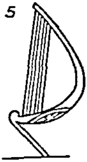

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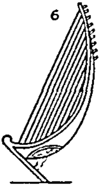

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elaborately made. There was great variety in their shape and size, number of strings and amount of ornament. Figure 9 shows one which must have been at least six feet tall. It has pegs at the top for tuning, and a figure of the head of the monarch at the bottom of the sound box. The number of strings of the Egyptian harps varied from seven to twenty-one. As early as 1470 B.C. fourteen strings were sometimes used, but thirteen was the usual number.

The harps of the Egyptians had no front pillar, such as the modern harps have, and their tones were probably low and sweet. Some were placed upon the ground to be played, some were held by kneeling players, and others rested upon stools while the players stood beside them. (Fig. 8.)

It is known that the ancient Hebrews and Assyrians also had harps. We read in the Bible that David cheered the spirits of King Saul by playing on the harp, and also that the Israelites hung their harps on willow trees by the waters of Babylon, because they could not sing the songs of Israel in a strange land. A harp used by the ancient Assyrians is shown on page 318. Figure 12 shows an angular harp pictured in an old Greek drawing.

Alfred the Great, King of England in the 9th century, was a harpist, and it is said that he once saved his country from an invading enemy by his playing.


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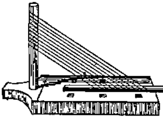
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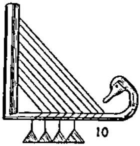
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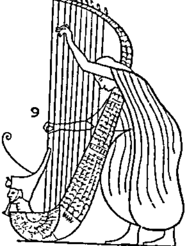
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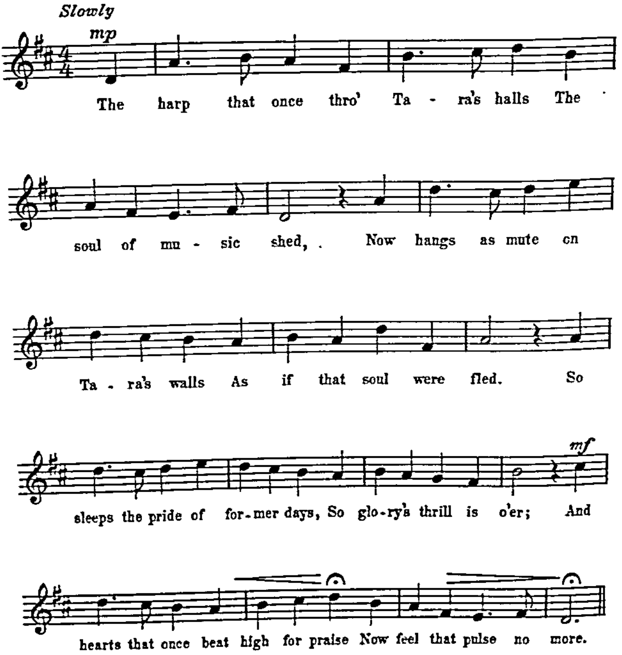
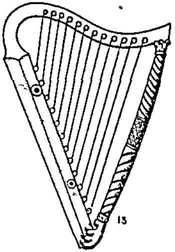
The Harp that once thro' Tara's Halls



When the Danes came down into England, King Alfred disguised himself as a traveling harper, and went into their camp in order to discover the size of their army and their plans of attack on the English. The Danes were delighted with his playing, and were pleased to have him stay and furnish music for them as long as he would. Here King Alfred gained all the information he needed in order to make plans by which he defeated the Danes and drove them out of the country. Figure 13 shows a harp of Alfred's day.



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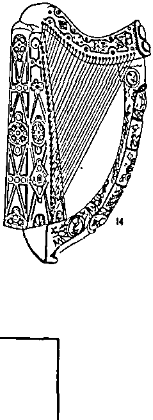
In Ireland the harp has long been used as a national emblem, and for many years a winged harp was pictured on the Irish flag. (Fig. 15.) The Irish harpers were famous in the Middle Ages, as were the wandering minstrels and castle harpers of other European countries.

In the early days of Ireland, the castle of Tara was the important meeting place for the nobles and lawmakers of that country. In the great banquet hall kings and nobles made merry after important matters of the country were disposed of, and each took his turn at playing on the harp. Here the minstrels came and cheered the company with their singing and harp-playing. The famous song, "The Harp that once through Tara's Halls," with words written by the Irish poet, Thomas Moore, deplores the passing of those olden days. (See page 322.) A beautiful harp that is said to have belonged to the Irish king, Brian Boru, is shown in Figure 14.



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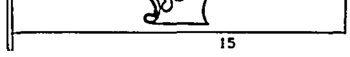
The harp was carried from Ireland to Wales, and



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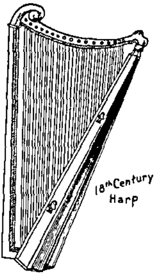
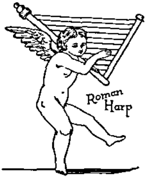
Dear Harp of my Country

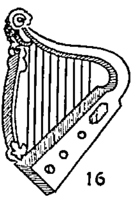
became a great favorite with the Welsh people. Indeed it was so highly honored that only people of high rank were allowed to play upon it, and it came to be a proof that a man was a "gentleman" if he could play the harp. According to the Welsh laws of the twelfth and thirteenth centuries, the "three things indispensable to a gentleman were his harp, his cloak and his chess-board." "Dear Harp of My Country," another song by Thomas Moore, has been set to a Welsh tune. (See page 324.)



The Irish, Welsh and early English harps were, as a rule, small enough to be held in the arm, or in the lap, or placed on a table while being played. The harp played by the little girl on page 318 is a modern descendant of the *Irish Harp*, and is often used by beginners. The modern *Concert Harp* is a large instrument and rests on the floor. The harp as we know it has lost the bow shape which many of the old harps had, and is triangular. In tone as well as in form many improvements have been made. By the use of pedals, a mechanism shortens certain strings to produce sharps, and by skilful manipulation of these pedals, a harpist may play in any key. The model that is now in general use was first made by a Frenchman, Sebastian Eberhard, in 1810. The picture below shows a modern concert harp and the position of the player.

In the harp the pitch of the different tones is regulated mainly though not entirely by the length of the strings, and for this reason it is shaped to provide





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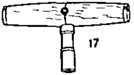
for strings of many different lengths. If you have a triangular frame with a row of strings fastened to one side, and drawn across the frame to an opposite side, it is clearly seen that no two strings will be the same in length. (See Fig. 16.) However, since the length cannot be arranged exactly according to the needs for tuning, the weight of the strings must also be considered, and the longer strings which make the low notes, must also be heavier. If you will examine a harp, you will see that the weight of the strings varies as well as the length, the longest strings being the heaviest ones, and the shortest, the lightest ones.



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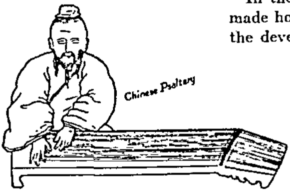
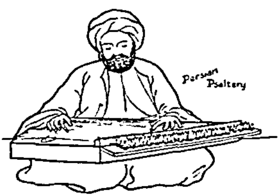
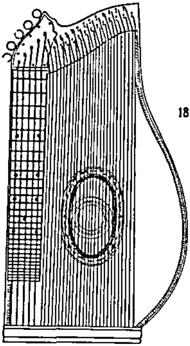
When the weight and length of the strings are arranged, the final regulation of the tone is left to be done by "tuning," which is the process of adjusting the tightness of each string until the sound is exactly right for each scale note. The makers of harps arrange for this "tuning" of the strings, by allowing one end of each string to be fastened to a peg that turns in a round hole, and winds or unwinds the string as it turns, thus tightening or loosening it as the need may be. This is the reason for the row of pegs along the top edge of all harps. In the ancient harps the pegs were usually turned by the fingers, but for several centuries they have been turned with a "tuning key" made to fit the peg. (Fig. 17.)

In the construction of the harp, the large pillar is made hollow and serves as a resonator. Very early in the development of stringed instruments, it was dis-





covered that resonance could also be obtained by stretching the strings over a box-like frame, one that extended the entire length of the strings. It was as if the harp with all its strings were laid flat over a shallow box. When the simple harp was turned over on its side with a shallow box instead of a hollow pillar for a resonator, it was called by other names, the *Psaltery* being one of them. Like the harp, the psaltery was played by plucking the strings with the fingers, or with a small piece of hard substance called a plectrum, in order to save the fingers.



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The psaltery was very popular in Europe in the Middle Ages and was made in many different forms. Some of them had strings all the same length, as in the case of the lyre, but most of them had strings of different lengths.

The *Zither*, which is still popular in some countries of Europe, is a form of psaltery. (Fig. 18.)

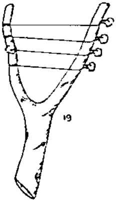
One day, after a little girl had eaten chicken for her dinner, she made a tiny angular harp by stretching a rubber band several times across the wish-bone of the chicken. Of course such a harp has no musical value, and could be used only for fun, but larger instruments of the wish-bone shape have been used in many countries.

It is very interesting to experiment with making simple instruments of the harp and psaltery type. There are so many ways one can contrive to stretch strings of different lengths across a supporting frame

12th Century Psaltery

and obtain musical sounds. Perhaps the simplest of all is the curved bow with a cord drawn across from one end to the other end. By making this cord tighter and tighter, and testing its sound, you can see for yourself the effect of tension on the tone of a string.

Then there is the *wish-bone* harp which you may make of the forked branch of a tree, if you can find a strong one that has a "Y" shape, and can find a few rubber bands of different lengths to stretch across it. Cut notches in one side of the stick and fit pegs in the other, as shown in Figure 19. Put the bands on, and adjust them until they make the tone you wish them to make. You may have to stretch some of the bands twice across the angle in order to have them tight enough. Of course your wish-bone harp will not stay in tune very long at a time, and can hardly be called a musical instrument. But it is interesting to make, and you can play little tunes on it even though it may slip quickly out of tune.



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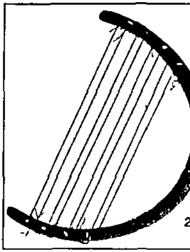
If you care to make a harp of the type shown in the old carvings on a tomb in the Egyptian city of Thebes (see Fig. 8), you will have to find a curved bow that is very, very strong, so that the strings may be drawn very tightly without pulling the bow out of shape. The wooden rim of a cart-wheel, or of an automobile wheel will answer if you can find one. The wooden rims for wheels are often made in half-circles, and they are usually made very strong and firm. Figure 20 shows a *Theban harp* made by stretching strings across half the rim of an automobile wheel. The strings are tied

through small holes bored in one side, and at the other side of the wheel they are attached to pegs that fit into the larger holes. The strings are regular harp strings bought at a musical instrument store. The tones of this instrument are very soft, since there is no resonating body.



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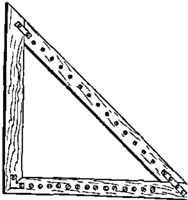
A triangular harp would be easier for you to make, since you would not have the problem of finding the frame—you could make one! The problem of the strings would be easier too, for if you will make the frame and string it so that there will be a considerable difference between the lengths of any two consecutive strings, you may have all of your strings of the same size.

(1) First fasten three wooden strips together with strong screws or nails in a triangular shape. (Fig. 21.) If you are a good carpenter, perhaps you can have smooth joints by cutting the wood at an angle so the pieces will fit together smoothly, and putting braces across these corners to hold them firmly.

(2) With a screw driver, drive small round-head screws in a row along one side. These will serve as posts to which the strings are fastened. Leave enough of each screw above the wood to give a place for the string to be tied. (*Fig. 22.*)

(3) On the other side of the frame opposite each screw bore a hole with brace and bit of the right size to fit the pegs you will use. The pegs must turn very tightly in these holes, for if they are loose, the strings will not stay in tune.

(4) Be sure that each peg has a hole in it which is



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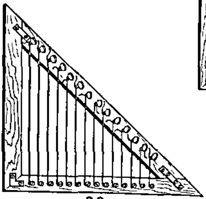

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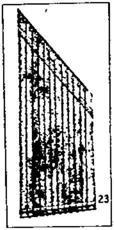


large enough for the string to go through, for unless the string is fastened firmly to the peg, it will not wind around it when the peg is turned.

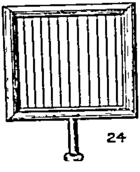
(5) Fasten the strings to the screws, draw them across the frame and fasten them to the pegs.

(6) By turning the pegs, tune the strings to the notes of the major scale, hold the harp in one hand and arm when you play it.

The tone of your harp is so soft that you may feel the need of a resonator. Perhaps the simplest way to increase the sound of the strings is to put a sound-box under them, a box of the same shape as your frame, and convert your harp into a psaltery! If you will hold your harp flat over different hollow things, over a tub, a deep jar, a pail or a pan, you will see the effect which a resonating box may have.

A shallow box with a very thin top makes a good resonator. If you can make a box of the same shape as your frame, bore or cut a few large holes in the thin top of the box, and then fasten it firmly underneath the frame of strings, you may find that the tone of your instrument is very much improved.

Or, if you are sure you wish a flat psaltery instead of a harp, it might be well to make the box first, and stretch the strings across the top of the box after it is finished. The main things are (1) to get a proper sound box, and (2) strings of the right length stretched above it, and (3) to have those strings arranged so that they can be tuned. If you will provide for those three things, you may make your box of any size and shape you



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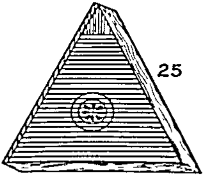

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wish. Figures 23, 24, 25 and 26 show the shapes of various psalteries that have been made, and these may suggest to you something which you can make without anyone telling you how to do it.

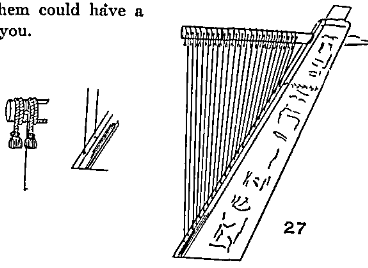
The psaltery may be played in the same way you play the harp or the lyre; or you may let it rest on a table or in the lap. Play tunes according to the number of strings you have. If your instrument is in perfect tune, try playing some of the two-part tunes given in Chapter X. You may play the psaltery as it lies on the table, the right thumb playing soprano, and the left thumb playing alto. See if it would be possible for you to play alto with the right thumb, and soprano with the forefinger of the same hand. Real harpists must use several fingers at once, just as piano players do.


26

No doubt you will enjoy making up melodies on your harp or psaltery. Its music, being soft and sweet, is well suited to a quiet evening at home.

In making musical instruments, the greatest fun of all is to find out by your own experiments what you need to know and make an instrument without anyone, or any book, telling you how to do it. Figure 27 is a drawing of a very old Egyptian harp. Could you make a harp of this kind without directions? Would you prefer to have your harp with or without a front pillar?

There are so many forms of the harp and psaltery shown in this book, that it would be possible for you to make a regular collection of different-shaped instruments, and perhaps some of them could have a form that is entirely original with you.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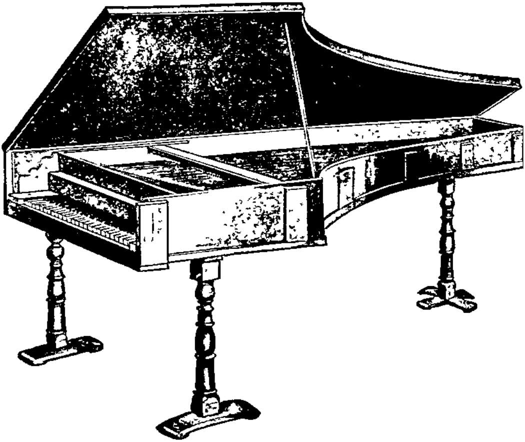


The Piano as made by Christofori

CHAPTER XXI

The Piano

THE hunter of ancient days who first tightened his bowstring and twanged it for the pleasing sound that came from it, little realized what would be the outcome of his simple toy. And we of modern days who enjoy the music of that wonderful instrument, the piano, seldom stop to think how it came to us, through many steps at the hands of inventive man, from a simple contrivance of only one string.

We have spoken of the harp, and of how it gradually developed in Egypt and in other countries, until it has taken the form of our beautiful modern harp. The piano is not a direct descendant of the modern harp, but a cousin, and their common ancestor was a very ancient harp of only a few strings. The main difference between the harp and the piano is that the harp strings are plucked with the fingers, while the piano strings are struck with hammers. So if we wish to trace the development of the piano branch of the harp family, we will have to go back to the time when some musician hammered his harp strings for a change, and thus started a new way of making musical sounds.

The Dulcimer is the name given to the early instruments of hammered strings. Perhaps the oldest type of the dulcimer on record is that used by the ancient

Assyrians who have left the forms of some of their instruments in carvings on their monuments. Figure 5 shows one of these Assyrian figures. The instrument, which consists of a number of strings fastened to a frame, seems to be attached to the body of the musician, who taps the strings with a hammer which he carries in his right hand. It has been suggested that the sculptor neglected to show the bridge which holds the strings at the highest point of their curve.

1

The dulcimer was used by other Asiatic peoples in ancient times, and it is mentioned in the Bible as being one of the instruments used by the Babylonians in their idol-worship (Daniel III, 5). The Chinese and Japanese had instruments of the dulcimer type, as did also the Persians. Figure 2 shows a Persian dulcimer of several centuries ago.

When the Cathedral at Manchester, England, was built in the 15th century, an angel playing a dulcimer was carved in stone, showing the kind of dulcimer which was common in Europe at that time. Figure 1 is a drawing of this stone carving.

2

The dulcimer was very common in Europe a few centuries ago, but is not often seen now except in Hungary and other parts of Europe visited by Hungarian gypsies. Figure 4 shows a simple dulcimer of the modern type. In some of the larger ones, as shown in Figure 3, there is a long bridge in the center that divides the strings into sections, so that one group of unison strings serves for more than one note.

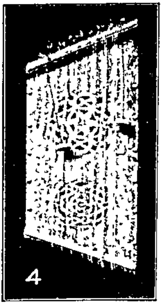
3

A dulcimer player uses different kinds of hammers, hard ones for loud notes and cloth-covered hammers for soft notes. The Hungarians call their instrument of hammered strings a *Zimbalon;* the Germans call it the *Hackbrett*—which means "chopping bowl," but when the instrument became popular in England, its tones were considered so sweet that it was called *dulcimer*, from *dulce*, which means "sweet."

If you will open the lid of a piano so that the strings are in view, you will see little hammers that strike by a mechanical device whenever the keys are pressed down. Thus in reality a piano is merely a dulcimer struck by hammers that are controlled by keys and levers.

The Spinet. There are a few other instruments that have played a part in the development of the piano which we must not overlook—instruments that were played by keys, and that had more of the form of our modern piano than the dulcimer had, though the mechanism for making the tone was different.

You will recall (page 327) that the psaltery was played by plucking the strings, either with the fingers or with a plectrum of some kind. Often the quill-end of a feather was used, and sometimes bits of ivory or hard wood. Finally some one invented a method of plucking the strings by mechanical means, though it is not known when or by whom this invention was made. A quill or "jack" was attached to a long piece of wood, and so placed that when one end of the wood was pressed down, the quill at the other end plucked the string.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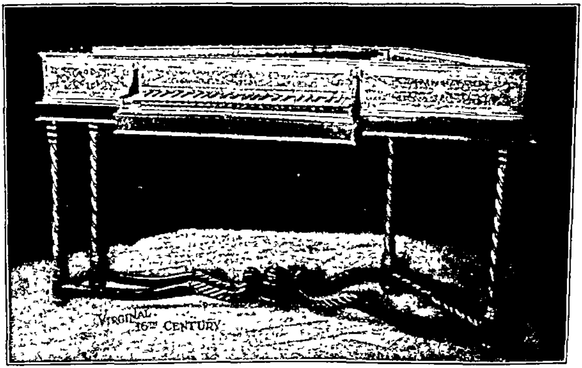
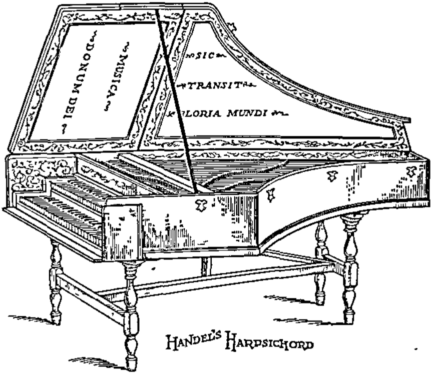


VIRGINAL 16TH CENTURY



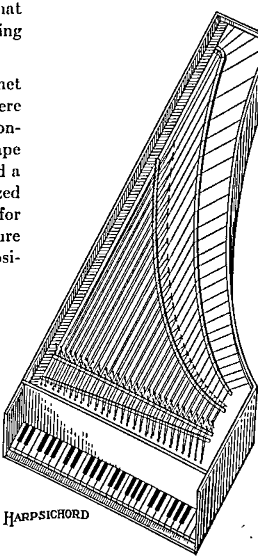
HANDEL'S HARPSICHORD

This keyed psaltery was called a *Spinet*. Many think the name was taken from the Latin word *spina*, meaning a quill. In the picture called "The Concert," on page 344, a lady is shown playing a spinet.

The spinet was popular in Europe in the 16th, 17th and 18th centuries. It had a pleasing, quiet tone, was easily played, and was considered very appropriate for young ladies. Because of this, or because the instrument was used by the nuns in accompanying hymns to the Holy Virgin, it came to be called the *Virginal* and was known by that name in England.

Queen Elizabeth played the virginal, and an instrument owned by her is still preserved in a museum in London. One of the pictures on the opposite page shows a virginal of the 16th century. In Shakespeare's day a virginal was usually to be found in barber shops, that the customers might amuse themselves while waiting their turn for a hair cut.

The Harpsichord was another instrument of the spinet family, probably so named because the strings were strung in harp fashion. The box, or frame which contained the strings and jacks, had more of a wing shape than the spinet and virginal had, though it often had a trapese form also. The harpsichord is really a large sized spinet. It usually had two strings tuned in unison for each note, while the spinet had only one. The picture below shows the strings, jacks and keys of the harpsi-



HARPSICHORD

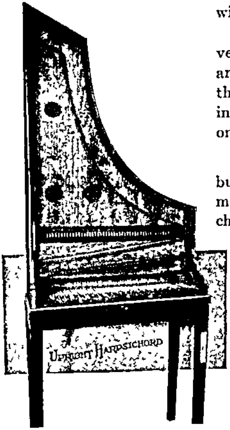
chord. Many of the instruments had two rows of keys—one above the other—and a sort of damper which was shifted by hand, and allowed the player to make some variety in the tones.

The harpsichord flourished in the days of some of our greatest composers. On page 336 is a picture of one which belonged to the German composer Handel, who was born in 1685.

Mozart also played the harpsichord. He and his sister, when very young children, traveled over Europe (beginning in 1762) and gave concerts on the harpsichord. Once when they were in Vienna, the Emperor played a joke on the "Little Magician," as he called the boy Mozart, by making him play with the keyboard covered so he could see nothing of what his hands were doing. But the boy played without a mistake. Afterwards the father used this as a special attraction in concerts, and the two children played duets with the entire keyboard covered.

The spinet, virginal and harpsichord were all developed from the psaltery, and were played by a mechanism which caused the strings to be plucked when the keys were pressed. The *upright harpsichord* came into use when the makers set the body of the instrument on one end, as shown in the picture on this page.

The Clavichord has perhaps made a greater contribution than any other keyed instrument to the development of the piano. We will give the story of the clavichord from ancient times:

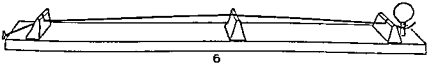


[339]

Pythagoras, a Greek scientist and philosopher who lived in the 6th century before Christ, tried some interesting experiments with the sounds of strings. He stretched a string above a long board and fastened it at both ends of the board, with a little cross strip, or bridge, at each end to lift the string and make it free to vibrate. This he called a *Monochord*, which means "one string." He tested the tone which this string gave when it was plucked; then he slipped a third bridge under the string between the other two, dividing the string in two parts, and found that he could make two different notes on his monochord, merely by plucking the part on each side of the central bridge. The bridge at each end was fixed to remain in place, but the third was movable and could be slipped to any part of the string.

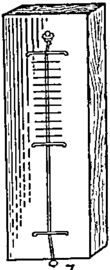
By means of this movable bridge Pythagoras discovered that, if a stretched string were divided exactly in half by a bridge, the tone of each half was one octave above the tone of the string at full length. He slipped the bridge so that it cut off one quarter of the string's length, and it produced a tone one octave above the tone of half the string's length. Each division in half caused the tone to jump an octave higher.

Pythagoras found, likewise, that two-thirds of the string's length made the tone a fifth higher than the tone of the full string, or the "open string" as it is called. Three-fourths of its length made the tone a fourth higher, and four-fifths of its length made the



third above the open string. By slipping the bridge to other places along the string, he found that all the different notes of the Greek scale could be obtained, and he was thus able to state a law about the tones made by the different lengths of a string.

Would you like to make a monochord and experiment as Pythagoras did, to see what you can find out about the lengths of strings and their tones? Figure 6 shows a home-made monochord which is easy to make.



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The monochord with its movable bridge was used for a long time in Greece for the exact measurements of the scale intervals, and indeed it was used in Italy as late as the eleventh century, to set the standard for the tones in the church music of that time. It was improved by having a large box fastened beneath the strings, which gave them more resonance. On this improved monochord tunes were played by slipping the bridge to cut off a certain section of the string for each note, and plucking that section with the fingers or tapping it in some way to make it vibrate. Figure 7 is an old drawing of one of these ancient monochords.

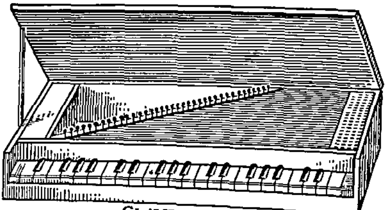
Finally some one thought of a mechanical device for playing the monochord. Several little bridges of metal, or "tangents," as they were called, were placed below the string, and these were attached to levers. When one end of the lever was pressed down, it caused a tangent to rise to the string, and if this tangent struck with enough force, it caused the string to sound. Of course it was desired that only one section of the string

should sound at one time; so a little piece of cloth was arranged to touch the part of the string which was cut off at the same moment the tangent struck it, and this cloth kept the section of the string on that side of the tangent from sounding, while the section on the other side gave a clear note. The little pieces of cloth were called "dampers," as they were used to dampen, or deaden the tone of that part of the string.

A monochord for playing the notes of the Greek tetrachord (page 83) had four tangents below the string, four dampers, and four little levers to be pressed down with the fingers. Thus several notes were played on one string, even as the shepherd makes several notes on one pipe of reed.

By and by more notes were needed in the church ritual of medieval days. So two strings of the same length were stretched side by side, and the tangents arranged so that some struck one string, and some the other. By this means two notes could be made at the same time to set the tones for the singers, who were then beginning to try out "part singing" in the church ritual. Later, four strings of equal length stretched side by side gave more room for the movement of the tangents, and made it possible to sound four notes at once! In time more strings and more tangents were added, keys were made on the ends of the levers, and an instrument like that shown below came into use.

Although this keyed instrument was still called a monochord, it was now in reality a *Polychord* (many

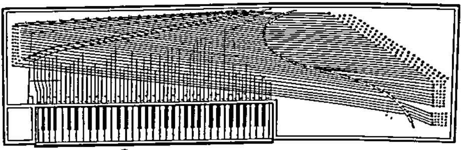


CLAVICHORD

strings). But it seems to have had many names. Sometimes it was called *Monochordium*, and later the *Clarichordium*, which soon changed to *Clarichordium*, perhaps from the word *claris*, which means "key." It was also called *Claricymbalum*, *Clarichord* and *Clarichord*. At present it is usually spoken of as the clavichord.

The sound producer in the clavichord is the stroke of the tangent, or metal bridge, upon the string, and the pitch of the note depends on the length of the string which the tangent leaves free to vibrate—the remainder of the string always being silenced by a damper cloth. Some of the "string notes" were produced by two or three strings fastened close together and tuned in unison. Since one string (or group of unison strings) could produce several notes by being struck in different places, there were more tangents and consequently more keys than string-notes. Figure 8 shows a clavichord of the 17th century seen from above, with its arrangement of many strings struck by tangents, and Figure 9 shows the same instrument with the strings covered.

As the number of strings increased, some of them were struck by only one tangent. The lowest and highest strings being made to sound only one note each, while those for the middle tones were supplied with two tangents. Finally, in the early 18th century, there was invented in Germany a clavichord with a separate string, or group of strings in unison, for each note of the chromatic scale, and with permanent bridges under strings of different lengths. Thus the clavichord took



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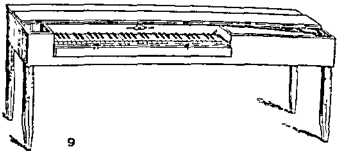
on the harp-shaped scale of stringing. It was called a "fret-free" clavichord, since none of the strings had to be "fretted" to obtain the full chromatic scale.

The clavichord was never loud in tone. But it was the only keyed instrument of the time on which the player could change the tone quality by different ways of pressing down the keys, and for this reason it was preferred by many as being more expressive than the spinet and harpsichord, even though it was weak in tone. The fret-free or chromatic-scaled clavichord had a compass of about five octaves. It was in general use in Germany until the latter part of the 18th century.

Johann Sebastian Bach, who is known to all students of music, played the clavichord and wrote many of his early compositions for that instrument. When the fret-free clavichord was invented, giving each pair of unison strings its own key and tangent, the size and possibilities of the instrument were increased, which pleased Bach greatly. He was thus enabled to tune a clavichord so that any note of its chromatic scale could be used as a key-note, or Number 1, of the major or minor scale. He named it the "well-tuned" or "well-tempered" clavichord. For this new instrument Bach composed a series of twenty-four *Preludes* and *Fugues*, in all the major and minor keys, and later another series of twenty-four. He named this collection "The Well-tempered Clavichord," but it is known to many as "The Famous Forty-eight." This series is known to all serious students of music as one of the greatest achievements in musical composition.



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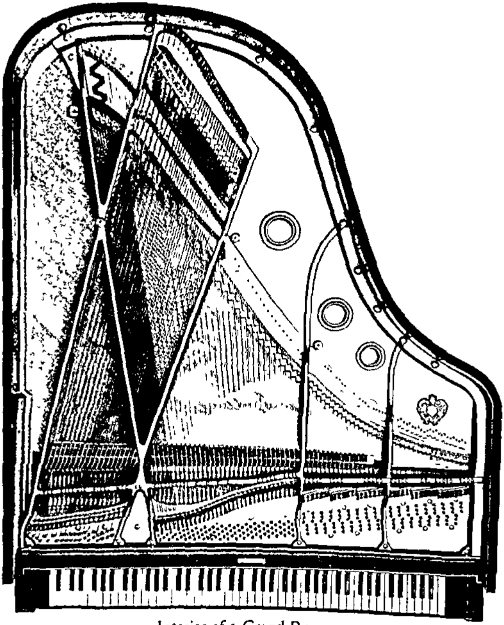
Young Handel in the Attic—Painting by Margaret Isabel Dicksie

The Concert
Painting by
Gerard Ter Borch

Handel, who lived at the same time Bach lived, is also to be associated with the clavichord. When Handel was a child his father wished him to be a lawyer. He discouraged every attempt the boy made to play music of any kind, and would not allow him to take music lessons. But in some way the child Handel, when he was only six or seven years old, managed to get an old clavichord put up in his father's attic, and he used to steal up into the attic and practice whenever he thought no one would hear him. One night when the house was still, the boy could not sleep, so he got out of bed and crept up the dark, creaky stairs into the attic, and even though it was dark, he played such sweet music that his parents heard it and were mystified. They too got out of bed, and taking a lantern, sought to find the source of this wonderful, soft music. They climbed the attic stairs, and there was the child in his night clothes, playing music which they would never have dreamed possible for him. The picture on page 344 shows little Handel at the moment he was discovered.

Not only Bach and Handel, but many of the later composers also played the clavichord, and wrote music for that instrument which has come down to us in the form of piano music.

About 1709 an Italian, Bartolommeo Cristofori, made an instrument which had the strings and outward form of the fret-free clavichord, but the strings were struck by felt-covered hammers instead of metal tangents. At this point our modern piano came into existence. The clavichord and the dulcimer—the strings



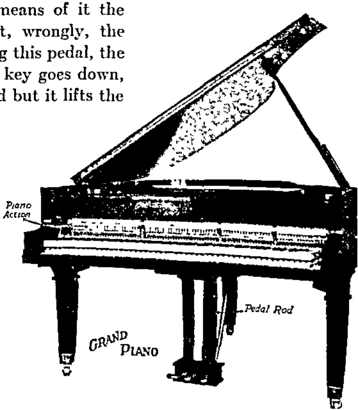
Interior of a Grand Piano

of one and the hammers of the other—combined to make the most widely loved instrument of modern times. Two pianos which Cristofori made are still in existence, and one of them, now in the Metropolitan Museum of New York, is pictured on page 332.

When strings are struck by hammers, it is possible to make both loud and soft tones, by changing the force of the hammers. For this reason the new instrument was called *forte-e-piano,* which means loud and soft. This name has been turned around and changed to *Pianoforte*, but more often it is called merely by the last part of its original name, *Piano.*

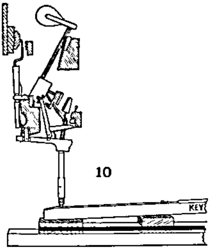
After Cristofori's first *forte-e-piano,* the way was open for all kinds of inventions to improve the instrument—better and stronger sounding-boards, stronger strings, better ways of keeping the strings in tune, more perfect striking hammers, more perfect control of the mechanism, better ways of increasing or shutting off the tone, until a marvelous instrument has finally resulted.

Perhaps you have noticed that if you press the right "pedal" of a piano while you play, the tones continue to sound after the fingers have left the keys. This is called the *damper pedal* because by means of it the dampers are controlled. Many call it, wrongly, the "loud pedal." If you play without using this pedal, the tone stops when the key lifts. When a key goes down, it not only presses the hammer forward but it lifts the



GRAND PIANO

damper from that string at the same time, and when the key is released, the damper falls back on the string and stops its vibrations. But the pedal allows you to keep all the dampers lifted from the strings independently of the keys. Figure 11 shows how a key may operate both hammer and damper, and also how the pedal controls the damper from another direction. This is the action in a "grand," or flat-top piano, where the hammers are below the strings. Figure 10 shows the action in an "upright" piano, where the hammers are in front of the strings. If you have an upright piano in your home, you can probably see for yourself the working of these hammers and dampers.



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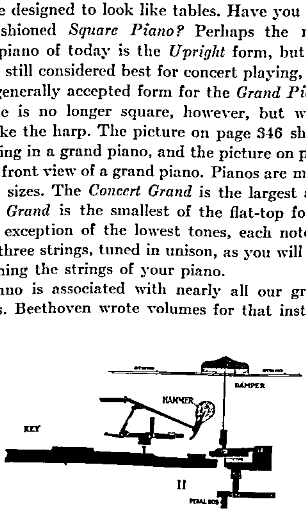
At first all the pianos were made with flat tops, and some were designed to look like tables. Have you seen an old-fashioned *Square Piano?* Perhaps the most common piano of today is the *Upright* form, but the flat top is still considered best for concert playing, and it is the generally accepted form for the *Grand Piano.* The shape is no longer square, however, but wing-shaped, like the harp. The picture on page 346 shows the stringing in a grand piano, and the picture on page 347 is the front view of a grand piano. Pianos are made in several sizes. The *Concert Grand* is the largest and the *Baby Grand* is the smallest of the flat-top form. With the exception of the lowest tones, each note is made by three strings, tuned in unison, as you will see by examining the strings of your piano.

The piano is associated with nearly all our great composers. Beethoven wrote volumes for that instru-



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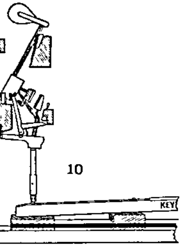
ment, his collection of *Sonatas* being the greatest ever written. Nearly all of Chopin's compositions are for the piano. If you can play the piano, perhaps you play some of Schumann's music, for he wrote many pieces especially for children. Many of our great composers were also gifted "pianists," as performers on that instrument are called. Mozart played upon a piano in 1777 and several times thereafter, though his early concert playing was on the harpsichord. In 1839 Franz Liszt, a young Hungarian musician, made a tour of Europe, playing the piano. In many of the same cities where Mozart had aroused wonder and amazement with his playing of the harpsichord seventy years before, Liszt astonished his audiences with his marvelous playing, and started the custom of "piano recitals." Many other pianists, great and small, have followed Liszt's example, touring not only Europe but America and other countries as well. Paderewski, whom some readers of this book may have heard, is one of the best known pianists of the present century.

Mechanical *piano players* have been invented which record the playing of pianists—reproducing even that of the greatest with marvelous accuracy. These and other inventions make it appear that there is no limit to the possible development and improvement of this instrument now known and enjoyed almost universally.



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CHAPTER XXII

The Lute

One of the carvings on an old Egyptian monument shows a musician holding an instrument with a small oblong body and a long neck, with at least one string stretched along the narrow neck. This carving is shown in Figure 1. It thus seems that at a very early date the Egyptians must have used a kind of instrument quite different from the lyre and the harp—a long slender instrument with fewer strings than either lyre or harp. In the Egyptian picture-writing, called "hieroglyphics," a picture of an instrument of this kind stood for the word "good," which shows that the Egyptians must have thought very highly of it. It is not known just how this kind of instrument came into being, but perhaps it was through idle fingering of the strings of other instruments that someone discovered how different tones could be made on one string.

Try this experiment: Fasten a violin string to one end of a long board, stretch it along the board and fasten it again at the other end of the board, drawing the string very tight. Slip a pencil under one end to lift the string from the board and allow the string to vibrate when it is plucked. You will then have a kind of monochord, such as is shown on page 339. Try its tone. Now press your finger on the string near one end.


1

and again try the tone. Press the finger in several places along the string and see what happens to the pitch of the tone. If you make the vibrating part of the string shorter, how is the pitch affected? How many different tones can you make with one string?

It is possible that the people who first made this discovery, tried many experiments before they finally found a way to use the idea in the construction of a musical instrument. The invention turned out to consist of a round or oblong or square sound-box of some kind, attached to a long, slender finger-board, with one or more strings fastened to the outer end of the finger-board, and to the opposite end of the sound-box.

It was Pythagoras, the Greek scientist—as perhaps you remember—who found out just how much a string should be shortened in order to produce a tone one octave above the fundamental tone (the tone of the "open string" as the string at its full length is called), and also for any other higher note. (Page 339.)

Can you play the eight-note major scale on one string? If you mark the places on the board where the fingers must touch for all the different scale notes, you will be able to play eight-note tunes on one string.

Ages ago a kind of instrument was developed which made use of all these discoveries about the shortening of the vibrating parts of strings, and its most distinctive feature was a long board, called a "finger-board," against which the string could be pressed. This type of instrument in which a finger-board is used, and different notes made on one string, we call the "Lute type,"


2

The word *Lute* comes from the Arabic name of the instrument, "Al'ud." It probably originated somewhere in Asia, and the Arabs derived it from the Persians. Many primitive forms of this instrument are still found in Asiatic countries, as well as highly developed and elaborate examples. In the earliest forms it probably had only one string. Later other strings, tuned to different tones were added.

The Egyptian carving shows that the performer is plucking the string with the right hand and pressing it down on the fingerboard with the left hand, exactly as one plays a guitar or banjo in these days.

When the Crusaders went from Europe to Asia in the early Middle Ages to rescue the Holy Sepulchre from the Turks, they failed in their main object, but they brought back to Europe many new ideas and many interesting things from the East, and among them was the lute. After this instrument was introduced into Europe it became more highly developed, and was very popular during the sixteenth and seventeenth centuries—almost as popular with Europeans at that time as the piano is today. "Lutenists," as lute players are called, formed part of the musical retinues of kings and princes, and at least one lutenist was attached to the household of every nobleman and member of the landed gentry. These professional lutenists composed their own songs and sang them to the accompaniment of their instruments, and they often set to music the poems composed by other members of the household. They gave their patrons instruction on the lute as well,

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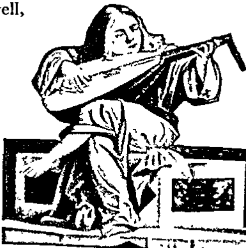
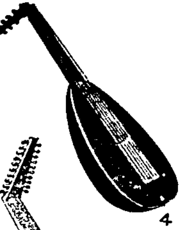


for lute playing was an accomplishment in which all fashionable people of the time were anxious to excel. The picture on page 350 shows three young people of that period. Could you invent a story, or perhaps compose a song about them?

The picture of a child playing a lute shown at the bottom of page 353 is taken from a famous Italian painting of about 1500.



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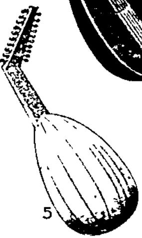
During the centuries when it was a popular instrument, many forms of the lute were developed. The body of the instrument was usually pear-shaped and made of many slender ribs glued together, as shown in Figure 5. The neck was usually bent back and a thin bridge or "nut" placed across it at the bend. In this way the vibrating parts of all the strings were kept the same in length.



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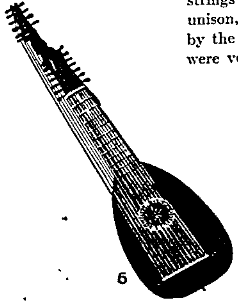
The shortening of strings by pressing the fingers on them is called "fretting," and instruments of the lute type have little cross-pieces called *frets* placed across the finger-board to mark where the fingers should press the string for making different notes. The frets are clearly seen in the curious old lute shown in Figure 7. The resonating body of this instrument is made of a turtle shell!

One of the early types of lute had eight thin catgut strings arranged in four pairs, each pair being tuned in unison, so that only four different tones were produced by the open strings. Later six pairs, or twelve strings were very common. In the seventeenth century lutes



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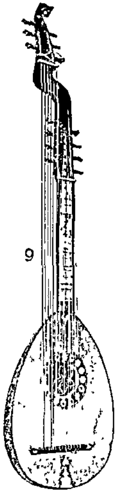
often had as many as twenty-four strings. Some of the strings were stretched near but not over the fingerboard as shown in Figure 6. These were always played "open," that is, without fingering.

Figure 9 is an example of the *Archlute*, a type designed to carry the longest possible strings. The archlute was as tall, or even taller than its player, as you may see by the picture on page 350.

With so many strings, the process of keeping them in tune must have been very troublesome. One of the writers of the eighteenth century says that if a lutenist attains the age of eighty years, you may be sure he has spent sixty years in tuning his instrument; also that there are so many things about the lute to get out of order, that in Paris it costs as much to keep a lute as to keep a horse!



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The finest lutes were made in Italy. Rome and several other Italian cities were famous for their beautiful lutes. They were often inlaid with ivory, tortoise shell, mother-of-pearl, and even jewels, with intricate carvings on the body and neck of the instrument, especially around the "sound hole," as in Figures 3 and 9. Figure 8 shows an ornate *Harp-lute* of a late period.

The lute has gone out of common use, but several instruments of the same type are still popular with us, and are descended from the oriental lute. Our *Mandolin* resembles a small lute. As in the lute of olden days, the body is pear-shaped, the neck is bent back, and the strings are in pairs, each pair being tuned in unison.

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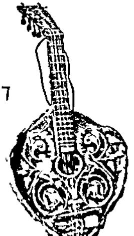

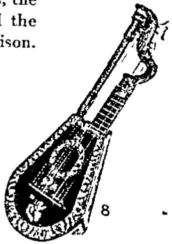

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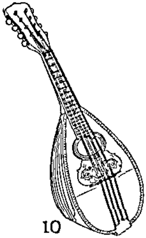
(Fig. 10.) Modern mandolins have wire strings, and are played with a hard plectrum which is drawn rapidly across each pair of unison strings.



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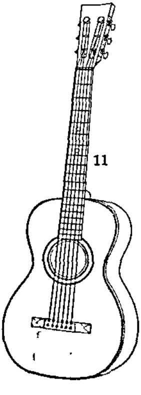
The *Guitar* was an instrument of the Moors in Spain, and has been popular in many European countries. The body is an oblong wooden box, flat in the back, and the neck is straight. Many examples are highly ornamented. Modern guitars have six strings, two of silk, wound with wire, and four catgut strings. (Fig. 11.)

Guitars are mainly used for playing chords as an accompaniment to singing or to other instruments that carry the tune. Chords are made of those notes of the scale that sound well together, or harmonize. As you remember (pages 166 and 200), 1, 3 and 5 make a chord which is always pleasing. You have probably played this chord in many keys. Numbers 4, 6 and 8 harmonize in a pleasing chord, and Numbers 5, 7 and 2 also. Have you ever tried to find chords on a guitar?

Most people are familiar with the *Ukelele* (Fig. 12), a small guitar-like instrument of the lute family which comes from Hawaii. This also is mainly a chord instrument to accompany singing. Several notes are made at once by a quick stroke of the finger or plectrum across all the strings. As in the guitar, the left hand remains near the neck, and by pressing down different strings, makes the changes needed for different chords.



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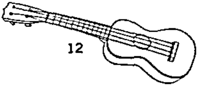

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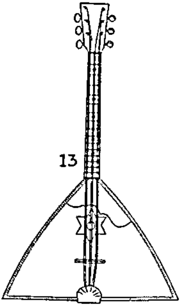
The Russians have a triangular kind of lute called the *Balalaika*. It is made in several sizes which are played together in very pleasing harmonies. (See Fig. 13.)



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A *Cigar-box Lute* such as is shown in Figure 14 is not difficult to make; and if one has the patience to work at it very carefully and accurately, some pleasing sounds may be produced on a home-made instrument of this kind.

The *materials* required are: A cigar box (not too shallow); a strong stick about 20 or more inches long and about $\frac{1}{2}$ x 1 inch in size—one that will not bend or break under the strain of four tightly stretched strings; 4 strings; 4 pegs; a finger-board about $\frac{1}{4}$ inch thick, $1\frac{1}{2}$ inches wide and about 16 inches long; tiny brads and glue.

The *tools* required are: A saw, hammer, brace and $\frac{3}{32}$ inch bit.

Procedure: (1) Clean all paper from box and lid. Use a little hot water if necessary to soften the paper but do not soak the wood in water. Why not?

(2) Put the lid aside to be used later. Tighten the joints of the box with small brads.

(3) At each end of the box cut out a notch so that the stick may pass through the center of the box. (Fig. 15.) If you have a deep box, the stick may go through the box with the narrow side down; otherwise

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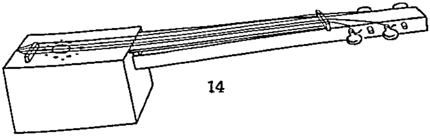

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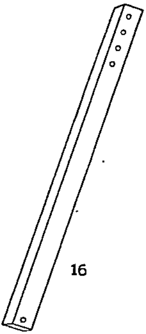
with the wide side down. The notches must be cut exactly wide enough for the stick to fit in tight; and they must be cut deep enough to allow the stick to rest about ½ inch lower than the top of the box.

(4) At one end of the stick bore a hole in which to fasten the strings. This will be the bottom of the instrument. At the other end bore the 4 peg holes, leaving plenty of room between the pegs to turn them easily. The stick will look like Figure 16.



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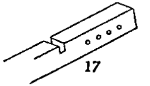
(5) About 1½ inches from the innermost peg-hole, saw out a tiny trough on the side of the stick that is going to be uppermost. Make this trough about ¼ inch wide and about ¼ inch deep. (Fig. 17.)



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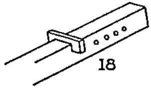
(6) Cut a little piece of wood ¼ inch thick, about ¾ inch wide and 1½ inches long, and fit it into the little trough. This is the "nut." Fill the trough with glue and fit the nut into it, narrow side down and very tight. (Fig. 18.)



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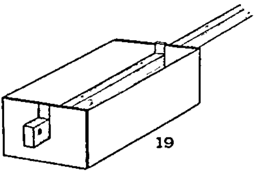
(7) Place the stick in the notches of the box so that the bottom end extends about an inch beyond the box. Glue it in place and fill the remaining part of each notch with a patch, cut to fit and glued in place. (Fig. 19.) The edge of the box must be even all around.

(8) Cut a little block of wood to rest on the stick just inside the box at the lower end. Make it heavier and wider than the patch, but no taller. Glue it against the patch and against the stick. It must come even with the top of the box. This is to support the patched end of the box. Support both patches in this way. (Fig. 20.)



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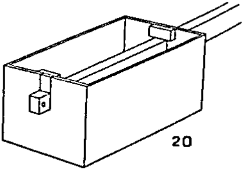

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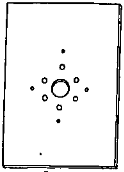
(9) The cover for the box must have holes in it. Why? Cut the holes either with a coping saw or by boring them with brace and bit. Very pretty covers can be made by boring several holes in some kind of design in the center of the box lid. (Fig. 21.)



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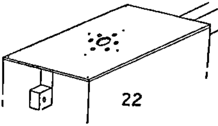
(10) Cover the edges of the box with glue. Lay the top on it. A tiny brad in each corner will help hold it down. (Fig. 22.) Weight it down and leave it to dry for at least twenty-four hours.

(11) Now make the finger-board. It must be as wide as the nut at one end, a little wider at the other end, and just long enough to fit tightly between the nut and the cigar-box. (Fig. 23.) The top surface of the finger-board should be on a level with the cigar-box cover. You will probably need to cut a little block of wood to rest on the stick near the box, and hold the finger-board level with the box cover. (Fig. 23.) A block of the same height should be placed under the other end of the finger-board at the nut, so that the finger-board will be straight.



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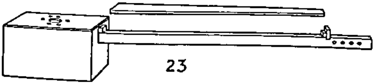
Glue the blocks and finger-board in place. A slender nail or two will help.

(12) Saw four little slits across the nut for the strings to pass over. (Fig. 24.) The slits should almost reach the finger-board but not quite. The nut need not stand over ¼ inch above the finger-board. If taller trim it down and smooth the corners. Sandpaper the slits for the strings.

(13) Cut a narrow strip of wood about 2 inches long and ½ inch high for the bridge. (Fig. 25.) It is to be



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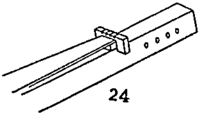

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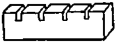
placed near the bottom of the instrument, and the strings must pass over it. Cut or saw four slits in the top of this bridge to hold the strings at equal distances apart. It is merely held in place by the tightness of the strings—not glued.



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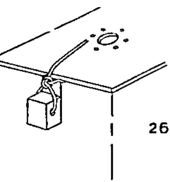
(14) Sandpaper the entire instrument, and see that no extra glue is left on the surface, for every spot of glue will show through the stain or varnish.

(15) Stain or varnish the instrument, as you prefer, and leave it to dry.

(16) When it is thoroughly dry put the pegs in the holes and fasten on the strings, tying them through the hole at the bottom of the stick. (Figs. 26 and 27.) Guitar strings may be used—three catgut and one wire string; or violin strings may be used if they are long enough. As you hold the instrument with the top facing you, the heaviest string should be on the left side and the smaller one to the right. (Fig. 29.)

After the strings are on, slip the bridge in place and let the strings pass through the slits in the bridge and in the nut.



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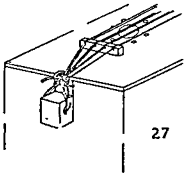
Tune the three catgut strings to Numbers 1, 3 and 5 of any major scale that seems to suit the strings you have, and tune the heavy string to Number 5 below. Having these three notes produced by the open strings, you may now find out how to obtain the other notes of that scale. First strike the open string that gives



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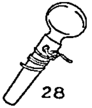

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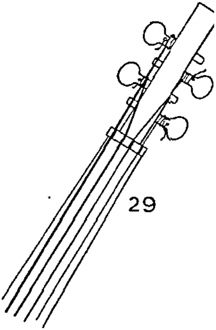
Number 1, then find where the finger must press down that string in order to produce the right sound for Number 2. Mark this place on the finger-board. Play the next open string for Number 3, and find the place where that string must be shortened for Number 4. Number 5 is again an open string, and the places for 6, 7 and 8 may also be marked under this string. Can you now play the complete octave on these three strings? If the low string is tuned to low 5, you can mark the places under that string for the low 6 and 7. If you have all these places marked on your finger-board, and if you can keep your strings in tune, you can play most of the tunes in this book on your lute after a little practice.



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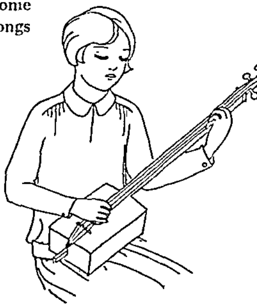
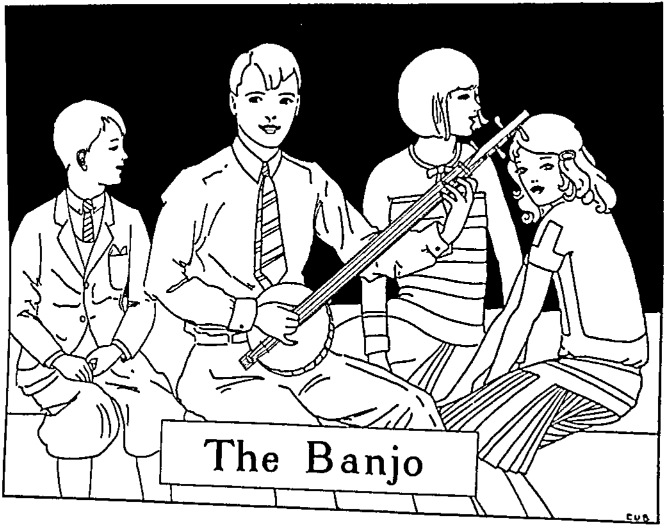
If you wish to play chords on the lute, it would be well to practice striking the three open strings that are tuned to the keynote chord—1, 3, 5—all at once, using the thumb, forefinger and middle finger. Practice this until you get your right hand used to chord playing. Then the fingers of the left hand may be brought into service to change the chord tones. Can you place two fingers of the left hand on the two higher strings so the right hand can play Numbers 1, 4 and 6 all together? Can you find a way to play low 5, 2 and 4 together? Can you play chords that sound right when you sing some of the songs given in this book, or some other songs that you know?




The Banjo

CHAPTER XXIII

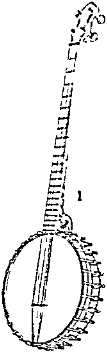
The Banjo

THE *Banjo* is a modern instrument which resembles those of the lute type in having a long finger-board and only a few strings, but differs from them in having a stretched skin as a resonating body while the lute has a sound box made of wood.

The Arabs, after developing a guitar-like instrument of the lute type, probably gave it to the negroes of West Africa. The Africans used this instrument and imitated it in their own way. It is possible that they were unable to make the thin board covering for the sound-box with much success, and that they tried using animal skins as a substitute for the wood. They had already made use of animal skins as coverings for their drums, and it seems natural that they should apply the same material to the new instrument. It must have been gratifying to them to find that a skin cover for the sound-box made the tone of the strings even louder than the thin wooden cover made it, and no doubt this offered encouragement to combine the use of strings and stretched skin in many ways.

When strings are sounded over stretched skin there is a peculiar "twang" which is easily recognized. An instrument of this type is called a "banjo." We think

of the banjo as belonging to the negroes of America, and especially to those of slavery days. The instrument in its simple form was brought from Africa with the slaves, and on the Southern plantations it was the usual accompaniment to the plantation songs and "clog dances." Sometimes bone clappers were also used with the banjo to help mark the rhythm of the song or the dance.



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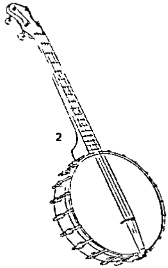
The *Minstrel Banjo* which was popular two or three generations ago, especially in the South, has a very long finger-board, a body like a drum-head of skin strained upon a hoop to make the skin resonant. There is no back to it. Usually there are five strings, one of them being much shorter than the others. This short string is placed to the left of the heaviest string, and fastened to a peg set into the side of the neck. It is called the "thumb-string" or "melody string," and being shorter than any of the others and no heavier than the lightest string, it makes the highest note, tuned about a fourth higher than the next highest note. The usual tuning of the banjo is low 4, 1, 3, 5 and 8. The heavy string which produces the low note is usually of silk, wound with wire. The other strings may be either catgut or wire. The catgut strings have the more pleasing tones. Figure 1 shows the type of minstrel banjo which is used at present.

The *Tenor Banjo* (Fig. 2) is a modern revision of the minstrel banjo, made much shorter, with wire strings usually played by a plectrum of some kind. There are sometimes four strings, sometimes five, and



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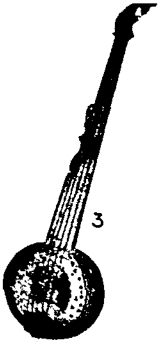
often there are eight strings tuned in pairs, like the mandolin. The tone of the tenor banjo is louder, but many people consider its tone less pleasing than that of the old-fashioned, long-necked minstrel banjo.

Most of the banjos one sees in modern times are manufactured by professional instrument makers. But in former days, especially in the South, many interesting examples of home-made banjos were to be found. The negro who raised goats could "cure" a goat-skin for his banjo, stretch it over a piece of thin wood bent into a circular shape, and leisurely whittle a strong piece of wood for the neck and finger-board. Doubtless much loving care was bestowed on the making of many an instrument, which was designed to give pleasure to its maker and his friends.

Figure 3 shows a banjo with skin stretched over a gourd for the resonating body; and Figure 4 shows another home-made gourd banjo, which was made in imitation of the museum specimen shown in Figure 3.

The banjo is used to accompany songs and dances, and is rather limited in its possibilities, but there are few boys and girls who would not enjoy having a banjo of their own make and being able to play a little on it. Figure 5, on page 367, shows a simple, home-made banjo. If you wish to make one, you must first decide what you will use for the rim or hoop, across which the skin is to be stretched. A round, wooden box from which you can remove the bottom, a small butter box such as grocers sometimes have, would be very good. If you cannot find such a box, perhaps you can find a



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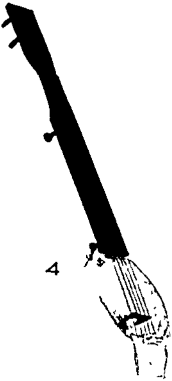

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long, thin—very thin—strip of some kind of wood which you can steam and bend into a round shape, and thus prepare your own rim. The sides of a square box, or a cigar box, may be used if you care to have a banjo of that shape, and if you can get the bottom out without splitting the sides.

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These are the *materials* you will need: a wooden rim strong enough to hold a drum skin stretched across it; a strong, slender stick, 30 or more inches long; a few small pieces of wood; a thin strip of wood for the finger-board; a piece of sheepskin; some paper clips, and four strings and four pegs. You may buy banjo strings at a musical instrument store—the catgut strings are the better kind—and you may either make or buy the pegs. You may either make or buy the little bridge, also.

The *tools* needed are: a saw, a hammer, a plane, a brace and two sizes of bit—one about $\frac{9}{32}$ inch in diameter to bore holes for the pegs, and one very tiny one to bore holes through the pegs themselves, unless you buy the pegs with holes already in them.

Procedure: (1) See that the edges of the wooden rim are even all around.

(2) In one end of the long stick bore a hole through the flat side. This will be the bottom of the banjo. In the other end bore four holes, also through the flat side, with a $\frac{9}{32}$-inch bit, one and one-half inches apart, leaving an inch or more at the end. These holes are for the pegs. (Fig. 6.)

(3) Two inches from the innermost peg-hole, saw

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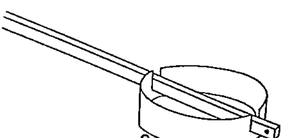

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across the narrow side of the stick, taking out a slice ¼ inch wide and ¼ inch deep. A little crosspiece called the "nut" is to be glued into this notch. From the side your stick will look like Figure 6.

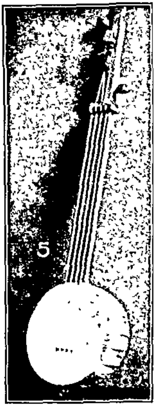
(4) Cut a block of wood for the nut. It should be about ¼ x ¾ x 2 inches and made to fit (narrow side down) into the notch you have just cut in the stick. Glue it firmly in place. (Fig. 7.)

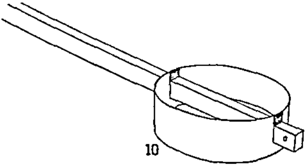
(5) Place the stick across the center of the wooden rim to mark the places, and cut two square notches in it, to allow the stick to run, narrow side down, through the center of the rim. The stick must be placed low enough to allow the top of the rim to be about ½ inch higher than the upper side of the stick. The stick must fit tightly into the notches. (Fig. 8.)

(6) Now cover the notches with glue and slip the stick into them with the "nut" side uppermost, letting the bottom end extend about 2 inches outside of the rim. If any cracks appear around the stick, fill them with tiny slivers of wood and glue. (Fig. 9.)

(7) Cut patches of thin wood to fill up the two ½ inch spaces above your stick. Make them even with the top edge of the rim and glue them in place. (Fig. 10.)

(8) These little patches may fall down if they do not have some support from the inside. Cut a thin strip of wood, wider than the patch, and glue it up against the patch in the inside of the rim, letting it rest on the stick and glued to it also. (Fig. 11.) Now that your stick is run through the rim and the rim patched up evenly, leave it to dry for at least 24 hours.

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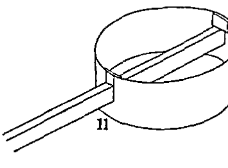
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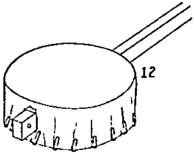
(9) Hold the instrument before the light and examine the glued places. If there are cracks around the stick, fill them with glue. If the cracks are large, use sawdust mixed with glue to fill them.

(10) Cut the sheepskin large enough to cover the top and sides of the rim, and to turn up a little underneath. Soak it in water until it is soft. Get your paper clips ready. When the skin is quite soft, squeeze the water out and stretch it over the top of the rim, pulling it down evenly all around. The edges of the skin must be turned under the bottom of the rim and held in place with the paper clips. Put two or three clips close together in one side, then stretch the skin very tight across the top, and put in two or three clips on the other side, straight across from the first clip. This is to keep the skin from being pulled too far to one side.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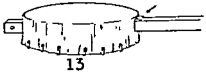
You will find that the stick, which passes through the rim, interferes with the skin coming down over the side at those two places. Cut a slit in the skin at each of these places, and fold under enough of the skin to enable you to pull it down evenly at the sides of the stick. Pull the skin straight down all around the rim, and put the paper clips about an inch apart all around the lower edge. See that the skin is very smooth across the top. (Fig. 12.) Now let it dry in a warm place, if possible, for if the skin dries rapidly it will be more resonant than if dried slowly.

(11) Cut a piece of thin wood about 2 inches wide, and a little longer than the distance between the rim and the nut on the stick. This is to be the finger-board.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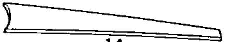
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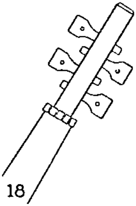
Shape one end of it so that it will fit snugly against the rim. Plane the edges. Now cut off the upper end to make it fit exactly into the space between the rim, and the nut. (Fig. 14.)

(12) The finger-board must be placed so that its upper side will be exactly level with the top of the sheepskin. You may have to put a little block of wood under the finger-board to make it the right height. (Fig. 13.) Glue it in place and drive one or two small brads through the board near the nut to hold it firmly in place. (Fig. 15.)

(13) Saw four little slits across the nut for the strings to pass over. Saw them nearly to the finger-board, but not quite. Fold a strip of sandpaper and sandpaper them. These slits must be just deep enough to allow the strings to come about $\frac{1}{16}$ inch above the finger-board at that end. (Fig. 16.)

(14) If you have bought your pegs, fit them into the peg holes, mark the places for tiny holes to be bored through them, so the strings may be tied on the part of the peg that extends on the outside. If you are making your pegs, whittle pieces of firm wood into the shape shown in Figure 17, and sandpaper the round part until it is smooth and will turn easily in the peg-hole. Bore a tiny hole near the large end. In placing the pegs it is well to push two pegs in from each side, having them alternate, so the strings can be kept straight. (Fig. 18.)

(15) Sandpaper all the woodwork, and then either stain or varnish it.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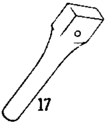
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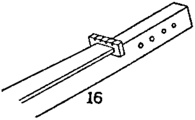
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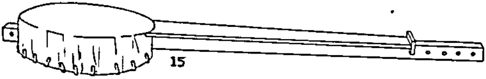
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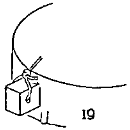
(16) When entirely dry, your instrument is ready for the strings. Tie one end of each string into the little hole at the bottom of the banjo. (Fig. 19.) Pull it up through the slit in the nut which was cut for it, and into the hole of the peg. Tie it very firmly to the peg, and turn the peg so that the string winds around it to be tightened, as shown in Figure 20.

When all the strings are on, see that they almost touch the finger-board at the nut, but not quite. If they touch it, the strings will rattle against the board when they are plucked; if too high above it, the finger will have trouble in pressing them down at the right places in playing different notes.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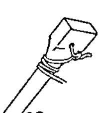
(17) From a small piece of wood, cut a little bridge shaped like Figure 21, with two little feet to rest upon the skin. In the top of the bridge, cut four little slits, to hold the strings on the bridge as they pass over it.

If you care to buy a bridge, all musical instrument stores have them, and they rest quite flat on their two little feet. Try the tone of your banjo, and see where to place the bridge in order to get the best tone.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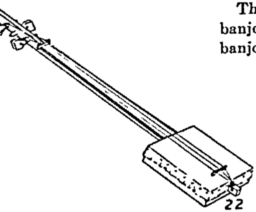
(18) Tune the strings to low 5, 1, 2 and 3 of any major scale which seems to suit your instrument, and your banjo is ready to play.

Figure 5 is a photograph of an instrument made after this fashion, and the boy in the picture on page 362 is playing one.

The half of a large cocoanut shell also makes a good banjo. Make it in exactly the same way the butter-tub banjo is made except for the fastening of the skin.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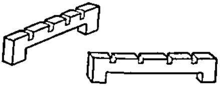
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Figure 24 shows a good way to hold the skin down with netted cord. Figure 23 shows a finished cocoanut banjo, and Figure 22 a cigar-box banjo.

The suggestions for playing the cigar-box lute given on page 361 will apply equally well to your banjo, as the two instruments are tuned to the same intervals of the scale, and the strings are plucked in the same way.

Remembering that the three small strings make the numbers 1, 3 and 5 of the major scale (if you succeed in tuning them thus), find out how to make all the notes from 1 to 8 on these three strings. Can you play eight-note tunes on them?

Use the high string as Number 1, and see if you can play the tune of Yankee Doodle.

The three small strings may be played together with the thumb, forefinger and middle finger in chords, thus:

1, 3 and 5, with all strings open;
1, 4 and 6, pressing down two strings;
2, 4 and 5, pressing down two strings.

Can you find the positions of the left hand fingers for these chords? Practice them until you can make the changes quickly and smoothly. Sing "Old Folks At Home," and see if you can use these chords in the right places as an accompaniment to your singing. Begin with the chord on the open strings; at the word "river" change to 1, 4 and 6; back to the open strings on the next word "far." Following this suggestion, can you finish the song?

Are there other songs you can sing while you accompany your singing with chords on the banjo?

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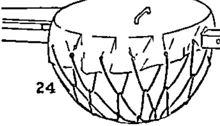

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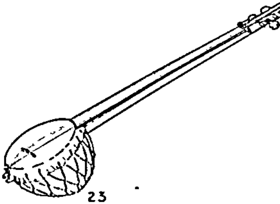
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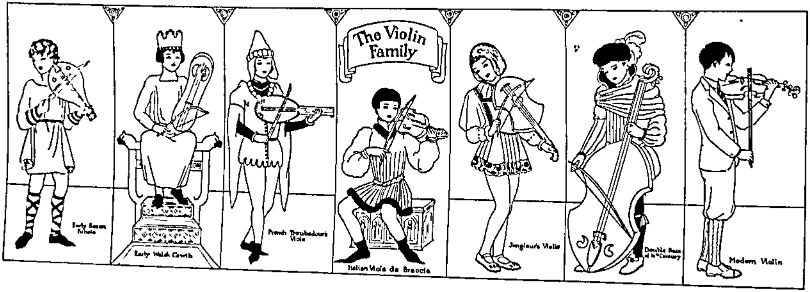

The Violin Family
Early Saxon
Early Welsh Crwth
French Troubadour's Viole
Italian Viola da Braccia
Jongleur's Vielle
Double Bass
Modern Violin

CHAPTER XXIV

The Violin Family

GEORGE was greatly interested in stringed instruments, and once he made a three-stringed banjo with half of a cocoanut shell for the body. He learned to play this instrument fairly well, and spent much of his leisure time twanging its strings, and finding out the various sound combinations he could make. George also had a collection of other stringed instruments he had made. There was a hunter's bow, a three-stringed harp made of a piece of plow-share, a monochord such as Pythagoras made, a nondescript instrument of several strings attached to a board, a wishbone harp, a queer-looking lute made of a gourd, a cigar-box lute, and a psaltery made of a flat cigar-box —all these besides his cocoanut banjo.

One day, just for fun, George drew the string of his hunter's bow across one of the strings of his banjo, and was surprised to hear a musical sound, different from the sound of the plucked string, and one that pleased him very much.

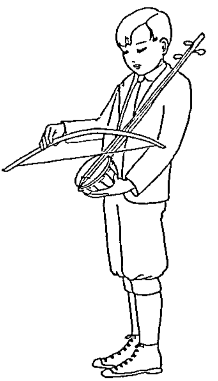
"O ho! How's this?" said George; "I play one instrument *with* another instrument, and the two together make fine music! I'll see what I can play with this new combination!" and he pulled the bow back and

forth across a string of the banjo, while his left fingers pressed it down on the fingerboard for different notes. Thus George "bowed" his banjo for a tune.

He had accidentally hit upon a very important fact: that strings do not necessarily have to be plucked or pulled, but that they may be rubbed by another object which, if it has a certain kind of surface, will keep them vibrating as long as the rubbing is kept up.

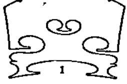
Before this fact was discovered by the human race, musicians knew of no way to keep a string in smooth and continuous vibration; for even though it might be plucked very rapidly, the tone was "jerky" and uneven. A properly rubbed or bowed string gives a continuous sound until the bowing stops or changes its direction, just as a wind instrument sounds as long as the blowing lasts.

Although George did not realize it, it is quite possible that the musicians of centuries ago, who were gradually building up the ways and means of the great Science and Art of Music, made this discovery in much the same way that his discovery was made.

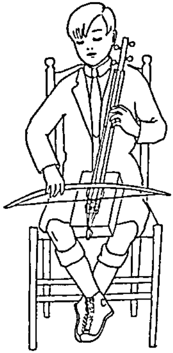


George had heard the music of a violin and of a 'cello, and had noticed that the tones were made by drawing a bow across the strings—not a hunter's bow, but one made of horse-hair, especially for the purpose. But he had not realized that these instruments are the outcome of many, many experiments and discoveries, and have developed from other more primitive types of "bowed" instruments.

George's discovery gave him an idea which he



promptly acted upon. He went to a music store and bought a small violin bridge to take the place of the banjo bridge. (Fig. 1) He cut three little notches in the top of the bridge to keep the three strings from slipping off the curved edge, and placed it under the strings of his banjo. He also bought some resin, such as he had seen people rub on violin bows, and changed his cocoanut banjo into a cocoanut fiddle! Holding the cocoanut shell between his knees, with the bow in his right hand, and his left fingers to press the strings for different notes, he then played many simple tunes in the funny "whining" tones of his cocoanut-banjo-fiddle!



George's experiments did not stop here. He tried his new bridge and bow upon his gourd lute, and made such queer sounds that the whole family were amused by it. The cigar-box lute seemed better suited to the new way of playing, for its sound box had a wooden top, and the bridge could rest more firmly. "The next time I make a cigar-box lute," said George, "I shall cut two long holes in the top, shaped like the holes in a violin, and place the bridge between them. Then I shall indeed have a real fiddle!" Later on he did this and made himself a knee-fiddle like the one in the lower picture on this page. This instrument was the source of so much fun, that George became deeply interested, and read everything he could find on the subject of bowed instruments. Of all that he read, these are the chief things that he remembered about them:

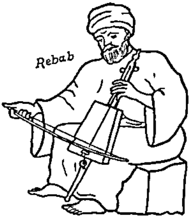
In India there is a tradition that Ravena, king of Ceylon, invented an instrument played with a bow long

Ravanastron

before the Christian era. This instrument was called, after his name, the *Ravanastron*. The ancient literature of India shows that the Ravanastron was in use there more than 2000 years ago, as well as other instruments played with a bow, the Sarinda, for instance. If indeed bowed instruments were invented in India, knowledge of them soon spread to other countries of Asia, and the Chinese, the Persians, and the Arabs made use of the bow very early in the development of their musical instruments. The Persians made the *Rebab* and probably passed it on to the Arabs. The picture below shows a primitive rebab such as may be seen in Arabia, today.

In the 8th century, the rebab appeared in Spain and Southern Europe, and it is possible that this instrument with its bow combined in some way with the three or four-stringed lute to make the European ancestor of the violin. The bowed instrument of the Middle Ages went by various names. In Germany it was called the "fiedel" or "vedel," in Southern France and Italy it was called the "viole." Both of these names have come down to us in the form of "fiddle," "violin" and "viola."

According to some writers however, the fiddle was developed from the lyre. It is supposed that the Romans carried the lyre to Great Britain in the first century of the Christian era, and in Ireland and Wales the *Crwth*, an instrument with fewer strings, developed from the lyre. A drawing of the Welsh crwth is shown on page 377. It was sometimes called by the Latin name of "fidicula," which is certainly more easily pronounced

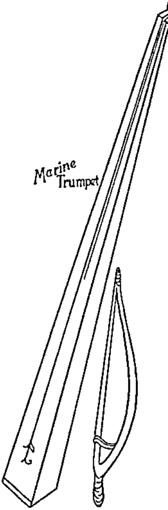


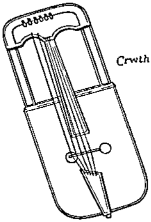
than the Welsh name! By placing a finger-board under the small group of strings, and adding a curved bridge to lift the strings a little, the crwth could be played with a bow. The second figure on page 372 shows how it was held in the 11th century. The upright pieces at the sides must have interfered with the movement of the bow, however, and the next development would naturally be an instrument with no upright pieces at the sides,—with only the neck attached to a resonating body, and with some kind of head or "peg-box" for tuning the strings.

The drawings on page 378 show various forms of old-time fiddles. They were popular with all classes of people, high and low. Wandering musicians carried them from place to place, played and sang for their living, and at the same time spread over the country a knowledge of folk-music. The parish clerks and parsons played them also. It is recorded that as early as 1203 the Parson of Ossemer "was killed by lightning as he was fiddling for his parishioners to dance!"

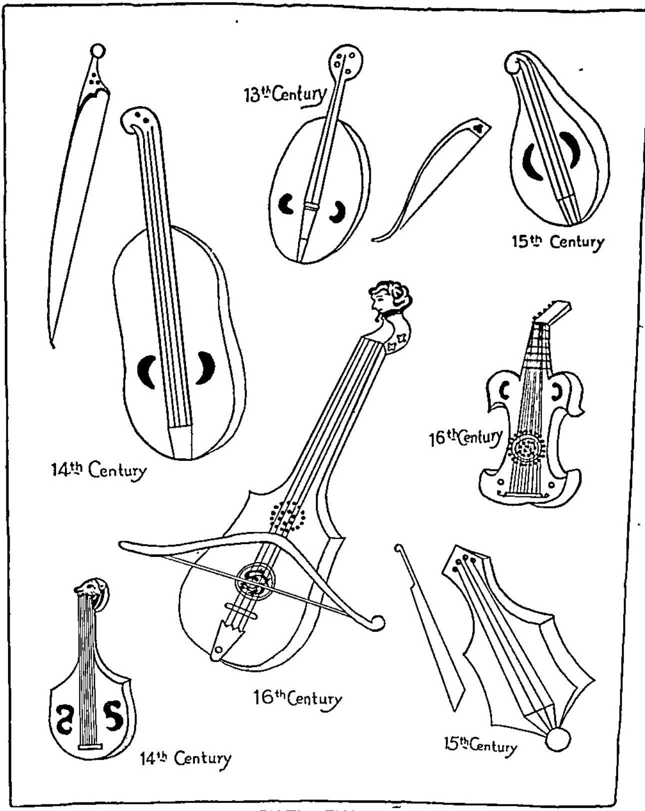
The long instrument with one string shown at the side of this page, was called the *Marine Trumpet.* It was somewhat like the ancient monochord and was played with a bow.

The earlier types of bowed instruments were probably held between the knees to be played. The picture below shows an old instrument of the 11th century played at the knee. As the various forms developed, some were lifted in the arms to be played, some of the larger types


Marine Trumpet


Crwth


11th Century Knee Fiddle



Old-Time Fiddles

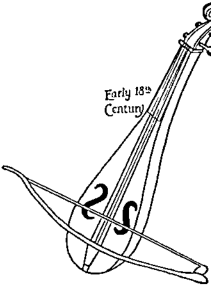
rested on the floor, and others were still held between the knees. The first figure on page 372 shows an early fiddle held at the neck.

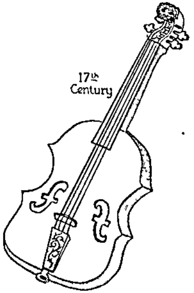
In later centuries a beautiful instrument called the *Viola da Gamba* or "knee viola," was developed from the knee-fiddle. There was also the *Viola 'da Braccia*, or "arm viola." The 18th century instrument at the side of this page is a viola da gamba, of a kind known as a *Sordino*. It has sound holes that are shaped like an S.

Gradually, as larger and larger instruments were made, they were more difficult to bow, so some inventive mind conceived the idea of making a fiddle with its middle part narrow to allow for free movement of the bow. It was shaped by cutting out a bow trough or "bout" on each side. These bouts formed the "waist" of the instrument. The Hindoos had shaped their Sarinda (see page 376) somewhat after this manner centuries before, to allow free use of the bow, but the Europeans who were developing the fiddle, were probably not familiar with that instrument.

The invention of the "waist" was the first step in the development of an instrument with artistic possibilities. In the angles of the bouts, corner blocks were placed to strengthen the instrument, and this also added to its resonance. The two pictures below are examples of early fiddles with "waists." Both of them were played at the knee.

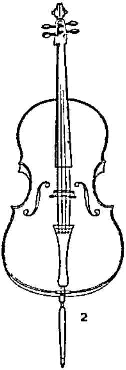
Various experiments were tried as to the shape and size of the sound-holes, until the shape of the letter *f*, such as we see in modern violins, was finally settled


Early 18th Century


17th Century


Viol da Gamba of 17th Century

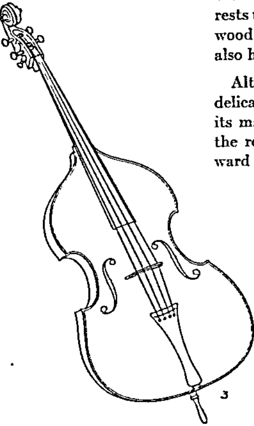
upon. Sound holes of this shape are usually called "*f* holes" (Fig. 6). The position of the sound-holes on the surface of the instrument was also shifted, until it was found that the best resonance was afforded when the *f* holes extended from about the middle of the waist to a short distance below its lower corners.



2

The bridge, which lifts the strings above the sound-box, has much to do with the tone of the instrument also. It is a slender wooden block that rests between the sound-holes and marks the mid-point of each *f*. (See Fig. 1.) At first it was probably a plain block, but various experiments have shown that the resonance of the sound-box is greater if an arch is cut in the bottom of the block, allowing it to touch the instrument in only two places, called the "feet" of the bridge. The foot that comes under the highest string also marks the place for the *sound-post*, a small wooden rod which is placed inside the instrument to help transmit the vibrations to the sound-box. The other foot of the bridge rests upon a part of the box underneath which a piece of wood called the *bass-bar* is attached. The bass-bar also helps to regulate the vibrations.

Although the violin seems simple, it is the most delicately constructed of instruments. All the details of its making and the materials of which it is made, are the result of careful experimentation with a view toward the perfection of its tone quality. The art of



3

The Violin Family

4

5

violin-making reached its height in the latter part of the 17th and early 18th centuries, in the work of Antonio Stradivari who was born in Cremona, Italy, in 1644 and died there in 1737. It is said that Stradivari made his first violin at the age of thirteen in the workshop of Amati, who was also a famous Italian violin-maker, and founder of a school of violin-making in Cremona. Stradivari worked for many years in the workshop of Amati, and his earlier instruments are signed with Amati's name as his teacher. But Stradivari soon surpassed his master, made improvements of his own and afterwards signed only his own name. He made violins, violas and violoncellos, and worked untiringly until his death at the age of 93. Some of the violins made by Stradivari and carrying his signature are still in existence, and are highly treasured by those who are fortunate enough to have them. Since age and good use only sweeten the tone of a well preserved violin, these are not less, but more valuable because of their age. Stradivari's methods have been preserved from century to century, and they are even today, the fundamental basis of the art of violin-making.

6

All the instruments played with a bow that are in common use today, are called members of the "violin family." There are four of them, differing in size, but of much the same form. They all have four strings over a high bridge, *f* holes of the same general shape,

and a waist, giving room for the movement of the bow. These four kinds of instruments constitute what are called the *Strings* of the modern orchestra.

The *Violin* (see Fig. 5 on page 380) is the smallest and best known of the four. Its strings are tuned in fifths to the notes shown on the staff at the bottom of this page.

It is held in the left hand with the body of the instrument tucked under the chin, as in the picture below. The bow is held in the right hand, and is drawn across the strings with a loose, free movement of the arm and wrist. Either one or two strings may be bowed at a time, as the player chooses. As the four strings are held up by a curved bridge, the bow may be made to reach any one of them by a slight movement of the arm, without touching the others, and again chords of three or four notes are sometimes played by sweeping the bow rapidly across several strings. By regulating the motions of the bow, violin tones may be made either loud or soft, either *legato* (smooth) or *staccato* (bouncing). (See page 134.) Sometimes the player holds the bow in his hand and plucks the string with a finger, and this way of playing is called *pizzicato*, this being the Italian word for "plucked."

The left hand regulates the pitch of the tones that are played by pressing down the proper string at the proper distance from the nut. Great dexterity of the hand and fingers is necessary to make all the notes which a violinist plays, and to make them all exactly in tune, for there are no markings on the fingerboard to show where

Violin

the fingers must fall,—they must feel their way, guided only by the ear and well trained finger habits. The left hand of a violinist slides up and down the finger-board from the neck to the body of the instrument as the tune may require, and often his hand must be lifted over the body of the instrument to reach the high notes made by playing near the bridge. It is also the part of the left hand to produce the *tremolo* or quivering effect one often hears in violin music.

Artistic violin playing is the result of years of diligent practice and untiring patience. There are so many motions and fine adjustments which the hands must make, and each hand must learn a different set of tricks! But the violin is capable of yielding such exquisite sounds, and such a wealth of music expressing any shade of feeling may be drawn from it, that many people are willing to give up several hours a day, year after year, to hard study and faithful practice in order that they may be able to express their musical feelings and ideas on this responsive instrument.

The *Viola* (Fig. 4) is made almost exactly like the violin, except that it is a little larger, and the neck a little longer. It is played in the same way the violin is played. Its four strings are heavier in proportion to their length than those of the violin; consequently their tones are more sombre, but they are very rich and mellow in quality. They are tuned in fifths, but their range is a fifth lower than that of the violin as shown on the staff below. One seldom hears the viola played as a solo instrument, but it fills an important place in the

"stringed choir" of the orchestra, where it takes the alto parts and adds much to the general effect by its rich tones.

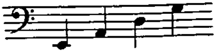
The *Violoncello,* usually called the *'Cello,* like the Viola da Gamba of earlier days, is held between the knees and rests on the floor by means of a spike attached to the bottom of the instrument (Fig. 2). It is much larger than the viola. As in the case of the violin, the bow is held in the right hand, and is drawn across the strings a little above the bridge. The left hand slides up and down the finger-board and presses the strings for the different notes. The 'cellist's left hand is frequently lifted above the body of the instrument, to finger notes that must be played on the part of the finger board that extends over the body of the instrument. (See picture.) The four 'cello strings are tuned one octave lower than the strings of the viola, as shown on the staff below.

The tones of the 'cello are deep, rich and beautiful. A 'cello artist can bring from his instrument tones that are as expressive and lovely as those of the violin, and many people enjoy its music even more than violin music. Like the violin and viola, years of practice are usually necessary for truly artistic playing.

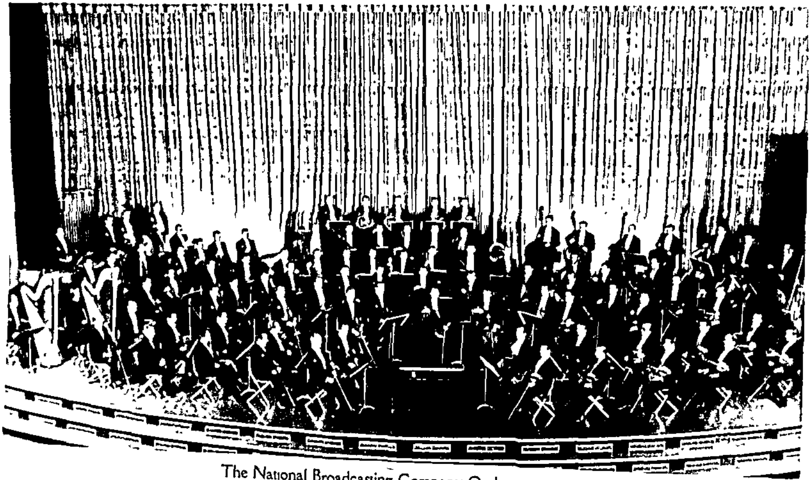
The *Bass Violin*, or *Double-bass*, as it is often called, is the largest member of the violin family (Fig. 3). As may be seen from the picture on this page, it is taller than a man of average height. It rests on the floor, on a short spike, and the player stands beside it. The bow is shorter and heavier than the 'cello bow and is held in the hand in a different way. Compare the pictures of the two instruments. Because of the great length of the strings and the greater spread which the fingers of the left hand have to make in reaching the different notes, it has been found more convenient to tune this instrument in fourths instead of fifths. The tones of the open strings are one octave lower than those on the staff below.

The bass violin is seldom heard except in orchestras, but there its deep booming notes are easily recognized. And when George listens to a concert with all the stringed family taking part, he often says to himself:

"The violin tones are wonderful! I can hear distinctly the rich mellow notes of the viola too; and the tones of the 'cello thrill me and fill me with a great joy. But when I get to be a man, the big bass fiddle's the instrument for me!"



Bass Violin



The National Broadcasting Company Orchestra

CHAPTER XXV

The Orchestra

ONE instrument played alone may be pleasing, but several instruments played together give greater pleasure—providing, of course, their tones blend well. There are few ways of spending leisure hours more happily than in music-making, when a family group or a group of friends play together. When several people play at the same time, many beautiful sound combinations may be made, and each player enjoys it as much as he would if he, alone, were making all those sounds. His pleasure is even greater because of the fun that comes from doing good "team-work." In music-making, good team-work is most necessary, for though there are few things more pleasant than harmonious sounds played together, it is also true that few things are more disagreeable than discordant sounds played together!

When several people combine their singing or playing, it is called *Ensemble Music*. The word "ensemble" is a French word meaning "together," or "all at once." When one person plays alone, it is called *Solo* music, from the Italian word "solo" meaning "alone."

The love of ensemble music is natural with human beings. The most primitive of savage musicians combine their sounds in a way that gives them pleasure, even though it may be very painful to our ears. And likewise,

the best musicians of the most highly civilized nations find pleasure in playing with others, while the greatest musical compositions ever produced are written for ensemble playing or singing.

There is something in man's nature that makes his heart glow when he has helped to make a fine and beautiful work of Art, whether it be a garden, a building, a play, music, or any other beautiful thing. The very height of this kind of pleasure is experienced when musicians combine their efforts, for the reward comes instantly, with every touch of key and every movement of the bow. The same thing is true of singing. It is fun to sing alone, but how much more joyous to sing with others whose voices blend in beautiful harmonies! Perhaps you have noticed this in your singing with friends or at school, and if you have ever helped in good "Community Singing," you will know how thrilling such an experience may be.

From the earliest times people have realized the great advantages of ensemble music over solo music, its greater pleasure and greater power over people. A concert of ensemble music is represented in one of the tombs of the Great Pyramid of Gizeh in Egypt (Fig. 1). This carving, which depicts a group of musicians playing on flutes, is about 4000 years old. We know that the ancient Egyptians made great use of their music,

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Chamber Music: As stated above, when one person sings or plays alone, it is called a solo;

When two people sing or play, it is called a duet;
When three people sing or play, it is called a trio;
When four people sing or play, it is called a quartet;
When five people sing or play, it is called a quintet;
When six people sing or play, it is called a sextet;
When seven people sing or play, it is called a septet;
When eight people sing or play, it is called an octet; or perhaps, a double quartet. Any of the above may be doubled. Usually when more than eight people play, it is called an *Orchestra*, or *Band*, or instrumental "club." When more than eight people sing together, it is usually called a *Chorus*, and sometimes a *Glee-Club*. The music played by small groups of players, as in the list given above, is called *Chamber Music* or *Room Music*, because it is best suited to a room, rather than to a large hall or out-of-doors. Chamber music may be played on any combination of instruments that the composer wishes to use in a small group.

The *String Quartet* has long been a favorite chamber music combination for musicians. It consists of two violins, playing first and second violin parts, a viola and a cello. This is considered by many to be the most perfect ensemble, because all four parts, soprano, alto, tenor and bass are represented, and the tones of the


String Quartet

strings blend so beautifully. Many quartets have become famous for their playing. The Flonzaley Quartet —one of the most widely known of String Quartets— is shown on the margin of the opposite page.

The great composers have written much music for Chamber groups, such as quintets, quartets and trios. The most common *Trio* combination is violin, 'cello and piano. On the margin of this page is a picture of the well-known Norfleet Trio, a real family organization of two sisters and a brother.

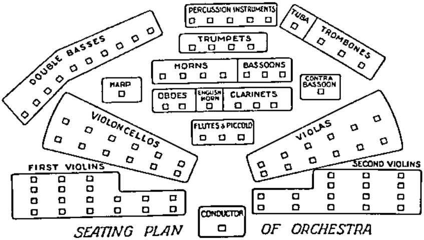
There are also combinations called *Chamber Orchestras,* often consisting of four stringed and four wind instruments, or of those numbers doubled. A *Stringed Orchestra* has only stringed instruments, and the *Woodwind Orchestra,* only flutes and reed instruments.

The Symphony Orchestra. A small orchestra may consist of any number of instruments that one wishes to combine, but a regular full-sized orchestra of modern days has at least fifty or sixty instruments with as many players. A large orchestra of this kind is usually called a *Symphony Orchestra,* for it is suited to play those long compositions of the great composers called *Symphonies.* (You may recall the melody from a symphony composed by Beethoven, that was given on page 215). The instruments of a full-sized orchestra are divided into four groups: (1) the *strings,* consisting of

violins, violas, 'cellos, double basses and harp; (2) the *wood-winds*, which are the flutes, piccolo, oboes, English horn, clarinets, bassoon and contra-bassoon; (3) the *brasses* consisting of French horns, trumpets, trombones and tuba; and (4) the *percussion instruments* (or the "Battery") which include the kettle-drums, bass drum, snare-drum, cymbals, triangle, orchestral bells and sometimes other instruments. Each group forms a kind of choir, carrying the four parts that correspond to the soprano, alto, tenor and bass of ensemble singing. Not all of the instruments listed are used, of course, in every composition played by the orchestra, and others are sometimes added to give needed effects in a special composition.

There are usually more violins than any other one kind of instrument, for they can best take the lead in the melody parts. Players and composers have studied the problem of giving the proper "balance" between the various tones of the orchestra. The following is considered a very good proportion of instruments to make the sounds evenly balanced: 35 violins, 12 violas, 12 'cellos, 10 basses, 2 flutes, 2 oboes, 2 clarinets, 2 bassoons, 2 trumpets, 4 French horns, 3 trombones, 2 kettle-drums, and one each of the other instruments.

It might be said that these instruments together make one great instrument which is played by the *Conductor* who stands in front of the musicians and guides and directs their playing. He holds in one hand



SEATING PLAN OF ORCHESTRA

a *baton*, or slender stick, which he uses to mark the time and meter of the music (Fig. 4). If the piece is in two-four meter, his stick goes straight down and up, two motions for each measure (Fig. 5). If it is three-four meter, he makes a triangle in the air, with three sharp corners (Fig. 6). If the piece is in four-four meter, he makes two sides of an angle, then makes the same angle going back from the opposite direction, so that his baton takes four movements for each measure (Fig. 7). The conductor uses the other hand to guide the players in expression and in giving various other signs to them. Each player knows his instrument so well that he does not need to look at it except for an occasional glance, and he is free to "watch the conductor with one eye, and his music with the other."

The conductor arranges his orchestra according to a definite seating plan, so that every player can see him, and so that he can produce the best possible effect in sound combination. All conductors do not use the same arrangement for their players, though the majority of orchestras are seated according to the plan given on the opposite page.

The leader of the group of first violins is called the *Concert Master*. He is a kind of vice-president of the orchestra and takes the lead when the orchestra rehearses without the conductor.

Since everyone depends on the signals of the conductor, he is, in one sense, the most important person

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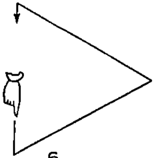

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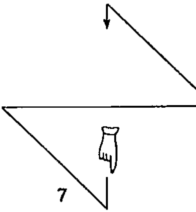

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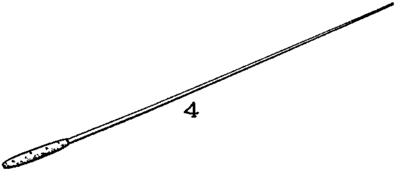

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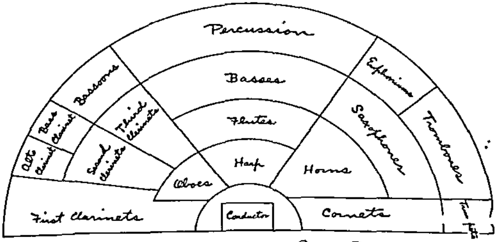
in the orchestra. On the other hand, every member plays a very important part. The *ensemble* effect is marred if a single note or drum-tap is made out of place. An orchestra player has to think of the total combination of sounds that are made together, and not that his own playing shall be heard for itself. In thinking of the beautiful thing his orchestra is making, he has no time to think of himself, and that is one of the reasons that people find so much real happiness in ensemble playing.

The orchestras described above are not the only interesting ones. There are primitive orchestras, in Africa, for instance, consisting of marimbas and drums, or bells and drums, or perhaps drums alone. All kinds of strange orchestras may be seen among Asiatic peoples, and even in our own country the combinations of instruments are many and varied. There are glee-clubs, mandolin orchestras, "jazz" orchestras, bell orchestras, and interesting school orchestras of all kinds. The orchestras that play incidental music at the theatre are sometimes combinations of a few stringed instruments and piano, sometimes strings and wood-winds, and sometimes all the instruments of the orchestra in small groups.

Bands: The music that is best suited for playing out-of-doors is band music. A band usually consists of



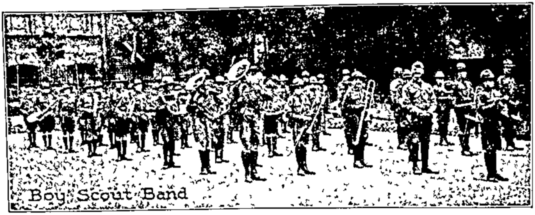
Seating arrangement for Sousa Band

wind instruments, mainly "brasses," and of percussion instruments, for their loudness makes them especially suited to the open air. Bands have been used in processions of all kinds since Man first learned to blow a horn. Any number of instruments may be used. Nearly every one in this country has heard of Sousa's Band. On page 394 there is a seating plan from which you may locate the various instruments used in this organization. School bands give many children a wonderful opportunity for ensemble playing on wind and percussion instruments. On the margin below is the picture of a Boy Scout band.

A *Drum Corps* may consist of any number of drums, with a few fifes or other wind instruments added to carry the tune, while the drums beat the rhythm.

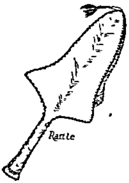
You may have played in a "glass" orchestra, or in an orchestra composed of marimbas, piano and drum. Perhaps the best of all music combinations is the *Family Orchestra*, for it is so easy to plan a time for practicing together, and it affords such splendid recreation without the trouble of leaving home for it.

In various chapters of this book, suggestions have been made as to how your different instruments may be combined with the piano, when different members of the family play together. So many simple instruments have been described, that in planning for such



Boy Scout Band

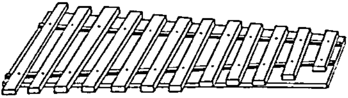
an orchestra you should be able to arrange something for every member of the family to play, and allow even the youngest ones to take part.



Rattle

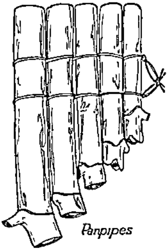
Robert was a 13-year-old boy who was very fond of music and tried to play every instrument he saw. He played the piano a little, and had also had much fun making and playing different kinds of simple instruments such as are described in this book. Not many instruments were made before he got the idea of combining them in an orchestra. His best friend, Tom, had made several also, and knew a little about playing on them. His sister Jane would help, for she could play the piano, and Nell, who was seven, could play something, no doubt. Robert got the instruments ready. His marimba and Tom's were both tuned to the key of G, so they tuned a set of glasses to that key. With Jane at the piano, Tom and Nell playing the two marimbas, and Robert the glasses, they tried "Lavender's Blue." It sounded so well that they played it over and over.

Mother came in with the two younger children, Roy, aged 5, and Helen who was only three. "O please let us play too!" they all three cried, and Mother joined Jane at the piano. Robert brought out his home-made drum for Roy to beat, but what could Baby Helen play? At last he thought of a rattle he had made, and he showed



Marimba

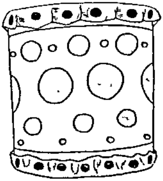
Helen how she was to shake it to the rhythm of the music. Oh how fine the music was! Jane played little "curly-cues" among the high notes of the piano, while mother played chords in the bass. The marimbas and glasses carried the tune and the drum and rattle marked the time.



Panpipes

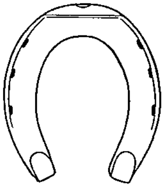
That night the orchestra played for Father, who insisted that he must have an instrument, too. So next day Robert made his father a set of panpipes tuned like the marimbas. He also found a horse-shoe to be used as a triangle, such as big orchestras have, and asked Tom's sister to come over and play the triangle. Ted came, too, and now that there were so many, it seemed necessary that the orchestra should have a conductor. So Ted was taught to play a few tunes on the glasses, and that left Robert free to conduct. With so many new players, it was necessary to start with something very simple, so they played "Hot Cross Buns" all together,—two people at the piano, two marimbas, panpipes, drum, triangle, rattle, and a set of glasses, while Robert stood up and waved his baton to show the meter, and see that they all kept together.

At first Robert had a hard time making the motions that conductors make with the baton in the right hand, and at the same time giving various "start," "stop" and "soft" signals with the left hand. It was as hard



Drum

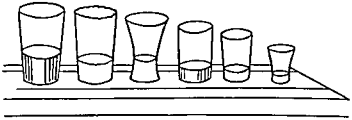
as drawing circles with one hand and squares with the other! But he practiced the arm motions in front of a mirror when he was alone, and finally got his hands and arms trained to do it very well indeed.



Nothing could have sounded more wonderful to that group of musicians than their ensemble of "Hot Cross Buns!" Next they tried "Making Music" and other three-note songs, and found that they sounded equally fine. In this orchestra every one except Mother and Jane played "in unison"—that is they all played the same tune; but Mother and Jane added different "parts" at the piano, sometimes tenor, sometimes alto, and made the harmonies. The three-note tunes went so well that they decided to try five-note tunes, "Lightly Row" and "When I was a School Girl." It was not long before this large orchestra was playing "Lavender's Blue" as well as the four children had played it on that first day.

Two or three children were brought in to join the orchestra, more panpipes were made, more glasses tuned. Regular meeting times were arranged, and within a few weeks they had made plans to invite the neighbors, and give them a concert!

Any family, or any group of people may have an orchestra of some kind. If you wish to have one, you can start with any two instruments you may happen to have, and gradually add players, one at a time. Many experiments will have to be tried; but if you



have made and played the instruments described in this book, and understand the discussions in the various chapters, you will be able to succeed as well as Robert succeeded with his orchestra. You can do even more than he did, if you have in your group some children who can play the piano, violin and other "real" instruments, for they can take the leading parts and supply the harmonies for your ensemble.

Whether your orchestra is of home-made instruments or of real orchestral instruments, which you have learned to play from other teaching than that given in this book, you will realize something of the great pleasure to be found in ensemble playing. Your experience will help you to understand why ensemble music has always been a great power in the world, and you will begin to appreciate those qualities of good music that caused the ancients to think of it as the greatest gift of the gods.